The New England
Journal of Medicine

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VOLUME 221 DECEMBER 7, 1939 NUMBER 23

THE PHYSICAL EXAMINATION OF GROUPS

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GROUP examination is largely a phenomenon of contemporary society. A generation ago, almost the only occasion for a person to submit himself to medical inspection for any reason other than his own inclination was an application for life insurance. At the present time he may be called upon to do so because he is contemplating marriage, entering college, medical school or naval aviation, applying for a barber's or automobile driver's license, or simply as a hygienic duty. The number and variety of groups requiring special types of physical examination are constantly increasing. If these examinations are to serve their purposes adequately, it is necessary for the examining physician to understand clearly the results which it is hoped will be accomplished, and to consider carefully the means best adapted to attain them.

With the development of modern industrial civilization there has come such an increasing intercommunication among large numbers of people, such community of interest and activity, that people function more and more as parts of groups. They naturally do not lose their individual ailments, and continue to require the ministrations of private physicians, but at the same time, as parts of large groups they affect the functioning of these groups, and certain aspects of their health which do not seriously affect them as individuals may definitely affect the functioning of the groups or even endanger the health of large numbers of other people. Thus, a man with a cold in the head may not be ill enough to require the services of a physician, but by going to work in a large factory he may come into personal contact with many people and transmit his benign cold to many of them; as a result, a certain number of these infected persons will develop bronchitis, sinusitis, pneumonia or even pulmonary tuberculosis, which they would otherwise have escaped. The handling of the man with a cold thus becomes a problem of group health. The economic aspects of an epidemic in a large body of employed persons are likewise apparent.

The functions and purposes of the group examination are different from those of the individual physical examination. By and large it may be said that just as the purpose of the latter is diagnosis as a guide to treatment, so the purpose of the group examination is prognosis. In the individual doctor-patient relation the search for a diagnosis leads the examiner to concentrate his attention on a possible disease. Most group examinations, on the other hand, deal with presumably healthy persons, and here the object of attention is the less tangible factor of the individual's capacity to withstand the strain of a disease or of the special hazards incident to a given occupation. A knowledge of pathology is necessary for a correct diagnosis: a knowledge of physiology, or the normal range of human capacity, is necessary for a correct prognosis, in the sense mentioned.

TESTS OF PHYSICAL FITNESS

Most of those who conduct group examinations accept this problem of prognosis as being one of determining physical fitness. Practically all group examinations start at this point, and their basis is the simple physical examination. A man is considered fit if he shows no signs of disease. This might seem adequate for the life-insurance examination, although even here other factors soon enter in, but it is not a satisfactory criterion for qualifying a man to be an army or navy air pilot. Even the simple physical examination has its prognostic value, however, as may be illustrated by the following experience.

In 1934 I directed the medical examination of 230 members of the police force of a suburban community at the request of the mayor, whose primary purpose appeared to be to bring about the discharge of some members who were considered undesirable. In the absence of any other

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guiding standard, I undertook to classify the men in four groups, on the basis of the physical examination routinely given in the Health Clinic of the Boston Dispensary. Group A comprised men with no significant physical defects; of these there were 69. Group B comprised men with one or two minor defects; of these there were 108. Group C comprised men with three or more minor defects; of these there were 33. Group D comprised men with major defects; of these there were 20. The distinction between minor and major defects was quite arbitrary but in view of the results was apparently sufficiently valid for practical purposes.

It was recommended — again arbitrarily — that those with three or more minor defects and those with major defects be retired as unfit for patrol duty. Not much attention was paid to these recommendations, the mayor acting on his own discretion. Five years later I investigated the status of all 230 men, with the results shown in Table 1.

TABLE 1. *Physical Status of 230 Police Officers Five Years after Classification on the Basis of a Simple Physical Examination.*

CLASSIFICATION	DEAD	PENSIONED OR DISCHARGED	ON ACTIVE DUTY
	%	%	%
Group A	1	5	94
Group B	4	3	93
Group C	12	12	76
Group D	20	45	35

In view of the rough prognostic accuracy reflected in results such as these, it is quite reasonable to strive for a better estimate of physical fitness than that obtained from a mere certification of the absence of disease or the presence of minor or major physical abnormalities. Many attempts have been made to evaluate physical fitness. One of these, which may be taken as representative since it embodies both the virtues and the defects of several others, is the so-called Schneider index, which has been widely used in the examination of prospective aviators. This was devised in 1920 by Edward C. Schneider,[1] of the United States Air Service Medical Research Laboratory. The index is arrived at by grading on a scale of –3 to +3 the response of an individual to six observations, as follows:

Reclining pulse rate; for example, a rate of 101 to 110 receives a grade of –1, a rate of 50 to 60 a grade of +3.

Increase in pulse rate on rising from a reclining position; for example, an increase of 35 to 42 from a reclining rate of 81 to 110 receives a grade of –3, an increase of 0 to 10 from a reclining rate of 50 to 80 a grade of +3.

Standing pulse rate; for example, a rate of 131 to 140 receives a grade of –1, a rate of 60 to 70 a grade of +3.

Increase in pulse rate immediately after exercise; for example, an increase of 41 to 50 from a standing rate of 100 to 140 receives a grade of –3, an increase of 0 to 10 from a standing rate of 60 to 90 a grade of +3.

Return of pulse rate to standing normal after exercise; for example, a return to normal within 0 to 60 seconds receives a grade of +3, one within 90 to 120 seconds a grade of +1, and a return to a level of 11 to 30 above normal after 120 seconds a grade of –1.

Change in systolic blood pressure in the standing position as compared with the reclining position; for example, a rise of 8 mm. of mercury or more is given a grade of +3, a fall of 6 mm. or more a grade of –1.

A cumulative total score of 9 or less is said to indicate physical unfitness, whereas a score of 10 or more indicates physical fitness.

A diagnosis of physical fitness based on such a test as this may properly be questioned not only on the basis of the physiological validity of the required responses, but also in respect to the meaning of the term "physical fitness."

A proper test of physical fitness must take into consideration the varying capacities of men, women and children at different ages to withstand specified strains or to accomplish specified objectives. Observations such as those of Robinson,[2] indicating the variations at different ages in the heart rate, lung ventilation, lung volume, oxygen capacity of the blood, hyperglycemia after severe work and adjustment to work, are of fundamental importance in arranging tests of physical capacity.

The consideration, too, of personality differences in evaluating the results of quantitative tests is of decided significance. Thompson,[3] at the Harvard University Fatigue Laboratory, has found, for example, that outstanding airplane pilots uniformly take in larger volumes of air during a normal inspiration — that is, they have a greater volume of tidal air — than a group of non-fliers of corresponding health and physique, and is inclined to attribute this difference in physiological pattern to a difference in temperament. The knowledge we possess in regard to correlation between physiological and psychological or mental variations is limited, and the field although promising, is as yet largely unexplored.

When a sufficient amount of data of this sort is available, it may be possible to apply it in the construction of tests of physical fitness which will tell us not only whether an individual is physically fit as compared to others of his group, but, more significantly, what sort of activity he is best adapted to perform. Data already at hand enable us to understand how Clarence De Mar at the age of thirty-seven was able to outdistance his younger competitors in the Boston Athletic Association marathon run, and why short dashes

are more apt to be won by younger men than by older. What sort of test can be devised which will tell us how a psychoneurotic, physical runt like T. E. Lawrence, who would almost certainly have been rejected for military service by an ordinarily competent medical examiner, could nevertheless, almost single-handed, accomplish the deeds recounted in *The Revolt in the Desert* and the establishment of the Kingdom of Iraq?

Until group examinations have attained a far higher degree of efficient selectivity than they now possess, a certain amount of injustice is likely to be involved in attempts to maintain rigid standards based on their results. It is of course necessary that personal rights and liberties be respected. Workmen have not infrequently objected to company insurance on the ground that routine medical examination of employees allows the employer to use so-called physical unfitness as an excuse for getting rid of unwanted employees. Opposition to medical examinations of automobilists might be expected not only from rejected drivers but also from automobile dealers and accessory salesmen, who might feel that their personal liberty had been infringed if many automobilists were ruled off the road because of physical or mental defects. This matter was well considered by John Stuart Mill,[4] who asserted: "Whenever there is a definite damage or a definite risk of damage, either to an individual or to the public, the case is taken out of the province of liberty and placed in that of morality or law."

A survey of group examinations shows that the need for them has developed in four main fields: life, accident and health insurance; public services, such as the Army and the Navy, police and fire departments, railways and air services; industrial medicine; and public health and preventive medicine.

INSURANCE EXAMINATIONS

The pioneer work in devising examinations adapted to the selection of good physical and mental risks was perforce done by the life-insurance companies. Many group-examination forms have been based on the medical forms used by these companies. They are chiefly interested in longevity and those factors which affect the expectation of life. The chief aims of their examinations appear to be as follows: to pick healthy people; to select people conforming to a standard type concerning which mortality figures or life-expectancy figures are available; to eliminate groups known to have a short life expectancy; and to rule out people with certain specified diseases. The specialist in this branch of medicine can tell us whether the life-insurance examination can be simplified, improved or standardized on the basis of collected data. He can also supply us from his files with medical information of wide interest. We have all learned, for example, of the important correlation demonstrable between overweight and increased mortality from diabetes and circulatory disease. Other facts are available. The late Dr. Edwin W. Dwight, former medical director of the New England Life Insurance Company, once pointed out to me an interesting correlation between a family history of "nervousness," nervous or mental disease, and death in middle age. Such a family history was of no significance in the case of the ordinary professional man, merchant, farmer or mechanic, but was associated with a sharp rise in death from accidental causes, for example suicide, during middle life when found in the family background of bankers, stockbrokers and others whose fortunes rose and fell with the stock market. In men likely to be subjected to sudden nervous strain due to financial crises, the family tendency to "nervousness," vague though this term may seem to be, was found to be of statistical significance to the company. It might also be of interest to the director of vocational guidance.

The type of selective examination best adapted to accident-insurance and health-insurance companies is different from that required by life-insurance examiners. Data acquired by experience in this field may well be of concern to those who envision a wider application of the principle of health insurance through private or governmental agencies.

PUBLIC SERVICES

The leading public services, the Army and the Navy, police and fire departments, air transport companies and railways, all have group examination procedures of their own which are in constant process of development and improvement. The necessity for such special types is obvious.

The Army and the Navy not only exercise rigid selection in assigning men for training or service, but also provide for periodic re-examination. This insistence on maintenance of physical and mental efficiency is not apparent elsewhere. Practically all our municipalities require a rigid physical examination of candidates for the police and fire departments, but few if any attempt to maintain physical standards, by means of subsequent periodic re-examination, after membership in the force has been attained.

Medicine as applied to aviation presents many problems. Among these are the effect of high altitudes on normal persons, those with circulatory impairments, nervous invalids and others; the selection of candidates for training, either military or civilian; and the protection of the lives

of aviators and their passengers. The only persons likely to be examined in groups in this connection are student aviators and licensed pilots. The examination of the former is aimed at the selection of men who will make the best aviators; that of licensed pilots is intended to minimize accidents, and to weed out those who by reason of age, disability or infirmity are no longer fit for their duties.

As is well known, the physical and mental qualifications of candidates for aviation service in the Army and the Navy are extremely high, and a great deal of study has been given to the matter of qualification for the various classifications of fliers. In the military branch, opportunity has been freely afforded for investigative work aimed at improving formal standards, and some tests, such as the complex co-ordination tests, have reached a high degree of development and application, even though they are not as yet obligatory. Dr. L. J. O'Rourke[5] is a pioneer in this field, and gives the following illustration of the great possibilities of such tests:

> Lieutenant K ... reported for ... tests. K. was possibly the best-liked man on the post, calm, a perfect physical specimen, [and] seemed to be the most even-tempered man on the post. He secured a AA on all his ratings, which were done by one or two out of five or ten thousand. While playing with the reaction-time material . . . I threw on a double reaction and a confusion [that is a buzzer intended to distract the subject during his reaction period]. He seemed to be so absolutely perfect that I wanted to see what he would do. Immediately he stopped and did nothing. I tried it seven times during that run, and each time when he got the double confusion his reaction time slowed and in each case he failed to do anything. I rated him as dangerous and I became very unpopular on the post. . . . All our other tests showed him to be a AA man. After considerable discussion he was permitted to go on. As the War Department records will show, on his first solo flight he killed himself — due to an unusual problem that came up ... air or wind ... and he was unable to co-ordinate. . . . His reaction time was slow and he crashed.

INDUSTRIAL MEDICINE

Industrial organizations often require the physical examination of applicants for employment or of candidates for promotion. This may legitimately be done for the purpose of determining the aptitude of the prospective employee for the work to which he may be assigned, or to secure as healthy workers as possible in order that the economic loss from absences due to illness may be minimized, or to reduce the employer's chances of assuming liability in case of illness or accident while at work. Standard insurance forms may be adequate for some of these purposes, but they will hardly serve as aptitude tests, or for selecting the best candidates, other qualifications being assumed, for promotion. Each industry has its own specific problems, and no blanket form can serve them all. A telephone company employing large numbers of young women as switchboard operators may find that the prevention of psychoneuroses or of dysmenorrhea is especially important, while a manufacturer of explosives may find that employees with normal vascular systems are resistant to chronic nitrite poisoning, and center his attention there. The special problems of industrial medicine are beyond the scope of this paper; suffice it to say that group examinations of specialized type are a necessary part of the program.

The need of fitting the examination to its purpose is here again to be emphasized. To do this requires close consideration of the end in view by those who plan the group examination. To reject a candidate for life insurance or charge him a high premium because of a systolic murmur or an inguinal hernia may be quite proper and in accordance with the experience of insurance companies, but to discharge a skilled designer of fabrics from a job he has held for many years in a textile mill because of these impairments, as was done in one case that came to my attention, seems absurd and unjust.

The problem is not only one for the employer and employee. It has its public interest, especially in the field of vocational guidance. This, like many other new fields, has not been overlooked by the quack with a formula. Vocational aptitude tests based perhaps on vocabulary and selling for twenty-five dollars, even though promulgated by psychologists and widely sold to the public, require impartial analysis by unbiased investigators before being accepted as authoritative.

PUBLIC HEALTH AND PREVENTIVE MEDICINE

Finally, the group examination is of increasing significance in the field of public health and preventive medicine. Here the so-called periodic health examination comes in for attention. Much space could be devoted to a discussion of the practicability and desirability of the routine examination of healthy persons, and of the results reasonably to be expected therefrom. Surely no one type of health examination can be devised which will properly evaluate the health hazards of any individual. The dangers confronting the infant and child are not identical with those faced by the middle-aged. Whether tuberculosis examinations, cancer examinations or cardiac examinations should be advocated instead of "health" examinations is a matter for consideration.

At any rate, it is possible to foresee the types of routine physical examinations likely to be de-

veloped to a point of greater efficiency. Such are examinations of the baby and the pre-school child, of public-school pupils and of college students, groups each of which has its own health hazards and therefore requires a different emphasis in routine inspection.

Premarital examinations are being widely urged. Shall a positive Wassermann test forever bar an otherwise healthy young man from marrying? It would apparently do so if we took seriously — as our legislatures may at any time decide to do if not advised against it — the well-meant agitation of various groups interested in social betterment. There are many conditions, such as insanity, feeble-mindedness, active or communicable tuberculosis and gonorrhea or syphilis, which might make marriage unsafe or improper. The establishment of proper standards and the arrangement of suitable types of examination to discover these impediments to marriage surely deserve the careful attention of the medical profession.

We are or may be called on to furnish certificates of medical fitness for barbers, servers of food or nursemaids. In some realistic countries the campaign against venereal disease includes routine examinations of prostitutes. Eugenic programs, sterilization projects and the examination of defectives and prison inmates offer other fields for consideration. The collection of data, the standardization of procedures and the methods of examination must be determined with the cooperation of the best expert medical opinion that can be supplied.

The examination of applicants for licenses to operate motor vehicles has attracted the attention of a number of influential groups. Its purposes are to safeguard the driver himself against accident, to protect pedestrians and drivers of other vehicles and to help reduce the economic loss due to accidents. Should the emphasis be placed on requirements for good vision, on the absence of physical impairments, on character or personality fitness, or on routine inspections for alcoholism among drivers on the highways?

There is little question that drivers who are physically and mentally normal are less frequently involved in accidents than are abnormal persons. Data are available in regard to the effect of the ingestion of alcohol. Holcomb[6] found, by means of routine examinations for the presence of alcohol in the blood, that in a group of drivers in accidents causing personal injury there were thirty-three times as many whose blood contained 1.5 parts per thousand (regarded as conclusive evidence of being under the influence of alcohol) as there were in the general driving population. Twelve per cent of drivers on the highways of Illinois had been drinking. Among drivers involved in accidents, however, 47 per cent had been drinking.

Periodic inspection might determine not only the state of alcohol saturation of the driving public, but such matters as intact motor function, mental condition, use of the extremities, vision (simple and color) and hearing and reaction times.

Twenty-five states now include a check of vision as part of their driver's examination. The National Safety Council has issued pamphlets presenting what are regarded as the best present and most desirable future practices in examining drivers. Medical examinations are obligatory for all drivers of automobiles in Germany, Bulgaria, Denmark, Holland, Hungary, Italy, Luxemburg, Norway, Sweden and Jugoslavia, with varying provisions for re-examination at intervals of one to six years, depending on the age of the driver.[7]

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These matters are of growing importance. As physicians we are being called on more and more often to conduct any or all these types of group examinations or to give advice as to their administration. We must prepare ourselves to do so in the same spirit and with the same systematic caution that we employ in the practice of diagnostic and therapeutic medicine, and we must combat quackery in group examinations just as alertly as in other fields of practice.

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DRUG THERAPY IN CASES OF INFANTILE CEREBRAL PALSY AND ALLIED DISORDERS, WITH SPECIAL REFERENCE TO HYOSCINE*

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A CONSIDERABLE body of literature has grown up concerning the etiology, diagnosis and treatment of infantile cerebral palsies. Heyman[1] in a recent article pointed out the multiplicity of causes. Phelps[2] and others have written comprehensively on diagnosis and treatment. Individual variations are striking, but the picture usually contains one or more of the following classic features: spasticity, tremor, inco-ordination, choreiform and athetoid movements and mental deficiency. The last-named defect is very difficult to evaluate because of the associated physical handicaps, but should be determined early because of the prolonged, arduous nature of the treatment and the need for compensatory intellectual assets.

As Phelps[3] has emphasized, "The training of such children is a general problem and involves the orthopedic, psychologic, speech and educational fields." These headings include hydrotherapy, massage and active and passive exercises. Such a program is being carried out on a selected group of patients at the Emma Pendleton Bradley Home, an institution devoted to the treatment of the neurologic and behavior disorders of childhood. It should be noted that the training described above includes no assistance from drug therapy. A search of the literature reveals no article describing a pharmacologic approach to these cases. In considering the problem the hypothesis was entertained that treatment of these children with a drug in the atropine group might reduce the hypertonus, influence the athetosis, speed up the process of the training and eliminate the annoying drooling. Attention was therefore directed toward this group.

Toward the close of the nineteenth century Erb[4] found that hyoscine (scopolamine) was much more effective in controlling the tremor and relieving the rigidity in parkinsonism than was any remedy previously employed. In physiological experiments on spasticity Walshe[5] found that the rigidity of the hemiplegic type of spastic paralysis and that of paralysis agitans are similar in nature and depend on the proprioceptive reflex from the muscle. This point gains further support from the experimental work of Davis and Pollock[6] on muscle tonus. We should therefore be able to influence this symptom by the use of atropine or an allied preparation. The drug of choice was hyoscine hydrobromide because of its widespread use in the parkinsonian syndrome. It was started in June, 1936, on a group of 6 cases and was continued, with minor interruptions, over a period of two and a half years. All these cases were carefully worked up and the patients had been in the hospital for a sufficient period of time for a base line to be established against which to evaluate the changes occurring during the clinical investigations. There was no change in the treatment program other than the addition of the drug therapy. During the course of this study the hyoscine was discontinued and the effects of three other drugs, phenobarbital, amphetamine (Benzedrine) sulfate and atropine, were tested over two-week periods. All these drugs were given by mouth. The effect of withdrawal of hyoscine and the tolerance that might be developed were also noted. The results of the drug therapy were evaluated by combining the independent observations of trained workers, — physiotherapists, teachers and nurses, — the reports of examining physicians and the study of moving pictures which were taken from time to time.

The following condensed reports indicate the type, duration and results of the drug therapy.

CASE 1. N. B., a 5-year-old§ boy, was admitted February 4, 1936. The family history was negative except for a similar difficulty which had developed in a younger sibling. The birth history was normal. Onset with tremor began at the age of 6 months, with increasing disability. At the time of admission the patient was unable to walk and showed marked generalized tremors, spasticity and drooling. Routine therapy for 4 months resulted in practically no improvement. On hyoscine hydrobromide, 1/200 gr. three times daily, he learned to walk in 3 days, the drooling and involuntary movements were greatly reduced and speech was improved. After 10 days on hyoscine the drug was withdrawn, whereupon the patient rapidly slipped back to his former state and was no longer able to walk. After 1 week without medication hyoscine was resumed, with a rapid return of the improvement previously noted. Because of some restlessness and difficulty in sleeping the dose was changed to 1/200 gr. twice daily, which maintained the improvement without any untoward

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§For convenience ages are given as of the time of starting drug therapy.

side effects. After 9 months on hyoscine it was again discontinued. Although the patient had been receiving this drug for a long period of time and it had been stopped suddenly, there were no mental disturbances. The drooling and tremors quickly returned, and although there was some improvement within a few weeks, he had still not returned to his former level after 6 weeks. Immediate improvement was again noted when the hyoscine medication was recommenced. After 2 years some slowing up in progress was noted, but was checked effectively by increasing the dose to 1/200 gr. three times daily. On phenobarbital, 1/2 gr. three times a day, the patient was sluggish and the tremors were more marked. On amphetamine sulfate, 10 mg. daily, he was tense and irritable. On atropine sulfate, 1/200 gr. twice daily, the tremors were diminished, but not to the same extent as with the hyoscine and the general behavior was at a lower level. It should be noted that for the first 6 months of his life this child was considered normal, and that there was definite progression in his disability during the next 12 months; therefore his condition probably represents a different clinical entity from the so-called cerebral palsies; but for practical classification as to care and treatment he fitted in easily with the above-mentioned group.

Case 2. W. M., a 9-year-old boy, was admitted June 12, 1931. The family history was negative except for diabetes in the mother, which complicated the pregnancy. The birth was a full-term, instrumental delivery. Livid asphyxia was present, and only after a considerable period of mouth-to-mouth insufflation were respirations established. When the asphyxial coma had passed it was noted that the child held his extremities in spastic attitudes. His development was very retarded. It was not until he was 7 years of age that he began to take a few steps. His progress during the next 2 years was extremely slow. His walking was interfered with by an extreme degree of spasticity and by wild bursts of choreoathetoid movements. Drooling was an outstanding symptom. When treatment was started he could get about with the aid of canes, but his progression was painfully slow. He was started on hyoscine, 1/200 gr. three times daily, but this was soon dropped to twice daily because of flushing and a slight rise of temperature. He was lethargic at first, but in spite of this, walking promptly improved. Drooling was immediately stopped by hyoscine. During a brief period when he was off the medication the drooling returned and athetosis again began to interfere with walking. When hyoscine was recommenced there was an immediate improvement in co-ordination. There was a noticeable improvement in posture and stride, better relaxation, increased confidence and a diminution of athetoid movements. In all the patient was observed over a 9-month period with this medication. Occasionally dryness of the mouth and flushing were noted, but the dose was not decreased again because of these symptoms. On withdrawal there were no mental disturbances other than a lessening of confidence and initiative. There was an immediate increase in overflow movements, but the patient gained considerable control over these within the next 10 days. On phenobarbital, 1/2 gr. three times daily, he began to manifest more athetosis. On amphetamine sulfate, 10 mg., there was less overflow and he walked better, but he was tense and less able to concentrate. Atropine sulfate, 1/200 gr. twice daily, produced essentially the same effect on the neuromuscular system as had hyoscine, but there was not the same increase in confidence and initiative.

Case 3. F. F., a 4-year-old boy, was admitted May 21, 1932. The family history was negative. The mother's pregnancy was complicated by severe hypertension. The birth itself was considered normal. At the time of admission, at about 2 years of age, he was unable to walk or even sit alone. Physical examination showed the arms to be weak and poorly co-ordinated. The legs were spastic, and attempts to walk with support showed a typical scissors gait. During the next 2 years in the hospital he made very slow but steady progress so that he learned to sit and stand alone. He was given daily physiotherapy. During April and the greater part of May, 1936, he was absent from the hospital and received no physiotherapy until June 1. On June 19 he was started on hyoscine, 1/200 gr. three times daily, which was dropped to twice daily 2 days later on account of restlessness and insomnia. On medication the drooling stopped and the muscular co-ordination immediately improved, so that 11 days later the patient was ahead, in his muscular skill, of the point he had reached at the time he left the hospital. There was also an immediate improvement in speech. After 9 months without increase in dosage the medication was stopped. Drooling reappeared and inco-ordination was much more apparent. There was a slight falling off in skill, but recovery within a few weeks to the level which had obtained prior to the use of drug therapy; since progress was slowed the patient was put back on hyoscine. On phenobarbital, 1/2 gr. three times daily, he was retarded and irritable. On 10 mg. of amphetamine sulfate he was restless and tense. On atropine sulfate, 1/200 gr. twice daily, the same physical improvement was noted as with hyoscine, but the patient was much more irritable.

Case 4. M. M., a 4-year-old boy, was admitted August 20, 1935. The family history was negative. The mother's pregnancy with this child was complicated by edema and convulsions. Labor was induced in the 7th month. The birth weight was 3 pounds, 4 ounces. At the time of admission the child could not walk or sit unaided. Physical examination revealed a typical quadriplegia with considerable spasticity, especially in the legs. Progress in motor skill in spite of daily physiotherapy was very poor. On June 18, 1936, the patient was started on hyoscine, 1/200 gr. three times daily. The dose was reduced markedly and finally discontinued because of sleeplessness and enuresis. However, the patient later showed similar symptoms when not on medication. Under the hyoscine there was relief from drooling and a questionable improvement in relaxation. On phenobarbital, ½ gr. three times daily, there was better relaxation but general progress was retarded. On amphetamine sulfate the patient was much more tense. On atropine sulfate he reacted poorly, becoming more tense and excited and less free in his movements.

Case 5. J. G., a 5-year-old Negro boy, was admitted August 6, 1935. The family history was negative. The pregnancy had terminated spontaneously in the 7th month. The child gained very slowly during the first few months, and a marked spasticity, especially of the lower limbs, was noted from an early age. At the time of admission he was unable to walk owing to the spasticity, but by the time drug therapy was started he was able to get about with the aid of canes. Drooling was prominent. The patient was started on hyoscine hydrobromide, 1/200 gr. three times daily. Under this medication he was more active and more confident, with somewhat better relaxation, but showed no improvement in spasticity. On withdrawal of the hyoscine, drooling returned and he was less

agreeable. On Luminal he was more relaxed but showed retardation. On amphetamine sulfate he was more alert but relaxation was poor. He received atropine sulfate, 1/200 gr. twice daily, for 8 days, with very little change.

Case 6. C. F., a 14-year-old boy, was admitted June 14, 1939. The family history was not unusual. The birth was difficult. Livid asphyxia was present in the infant, and it was some time before normal spontaneous respirations were established. Marked spasticity and choreoathetosis were noted from an early age. Speech was developed early but was very dysarthric. Intelligence was at a superior level. Under long-continued physiotherapy the patient learned to walk, but his progress was painfully slow and he never developed a good posture. Walking was often interrupted by bursts of severe choreoathetosis. Drooling was present. He was started on hyoscine hydrobromide, 1/200 gr. three times daily. This dose was slowly increased to 1/50 gr. three times daily, which was maintained 1 week, but since there was no more change in physical progress and no correlated change, the medication was stopped without any change in attitude or behavior. Hyoscine was considered to have been ineffectual in this case except for the control of drooling.

Under hyoscine therapy, drooling was abolished in all cases. Offhand this may seem to be of little consequence, but practically it looms rather large in the management of these patients. If salivation is excessive their belongings and clothing are constantly moist, and it proves very difficult to keep the children dry and warm out-of-doors in the wintertime. In 5 of the 6 cases reported increased confidence was noted. This may have been due to the central action of the drug or to the encouragement of more rapid progress and better control of muscular activity. Three of the 6 patients exhibited increased relaxation and lessening of involuntary muscular movements and improvement was obvious. In 2 of these cases the gain was definite but not particularly dramatic, but in the third (Case 1) it was striking, since the child learned to walk again in three days. It is true that the gain in some of the cases was small, but when one considers what difficult problems these are, the slight effort and expense entailed in providing them with this medication are well worth while. It should be noted that the beneficial result appears early if at all, so that a long period of trial is unnecessary.

No contraindications to hyoscine therapy were established. One child reacted poorly when hyoscine was instituted but later had similar reactions when not on medication. The effective dose produced no disturbing or distressing side effects. There was no evidence of increasing tolerance. The dose in one case was increased after two years, but the child had of course gained in weight and stature during that period. The question of addiction has been considered. The only report found on this is by Schaltenbrand,[7] who observed a rapid deterioration in the condition of patients with postencephalitic parkinsonism when hyoscine was discontinued. This does not coincide with the views of many clinicians, nor was such a change observed in our series. As indicated in the case reports, the treatment was suddenly discontinued after the children had been kept on the medication for many months. There usually followed a period during which the child's motor performance was definitely inferior to what it had been while on drug therapy, but in no case was he any worse than when the treatment was instituted, and after a short period of readjustment the patient returned to a state superior to that observed at the time medication was begun.

The reaction to the other drugs employed was disappointing. The responses to phenobarbital, amphetamine sulfate and atropine sulfate were successively investigated. This was done by cutting all previous medication, establishing a new base line and evaluating the response to the new drug by co-ordinating the reports of various observers. Five patients in this group received phenobarbital, ½ gr. three times daily. All seemed to be retarded; one showed considerable irritability, and another exhibited increased athetoid movements. On 10 mg. of amphetamine sulfate daily 5 children were tense and irritable and could not relax. Five children received atropine sulfate, 1/200 gr. twice daily, by mouth. Excessive drooling was stopped in all cases. Two children showed decrease in the athetosis, but they did not have the same confidence as they had had while on hyoscine. Two patients became tense and excited. The fifth child showed little change.

CONCLUSIONS

The present therapeutic approach to the problem of the spastic child takes advantage of many forms of therapy, but it is believed that drug therapy has not received adequate trial.

A few carefully studied cases were placed on hyoscine hydrobromide. The usual maintenance dose was 1/200 gr. given twice daily by mouth. The response was most encouraging in that drooling was stopped, athetosis lessened, confidence increased, relaxation improved and progress in retraining more rapid. One child learned to walk in three days.

No general contraindications to hyoscine were established. In particular, there was no increasing tolerance, no annoying side effects, and no untoward symptoms even when the drug was suddenly withdrawn after periods as long as nine months.

The favorable response to hyoscine came early or not at all.

Amphetamine (Benzedrine) sulfate, phenobar-

bital and atropine sulfate were investigated clinically in the same series. The therapeutic results of this part of the study were disappointing.

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A COMPARISON OF THE DAVIES-HINTON AND WASSERMANN REACTIONS IN THE CEREBROSPINAL FLUID

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THE Hinton flocculation test for syphilis has been modified by Davies[1] to make it applicable to the cerebrospinal fluid. Since 1936 the Massachusetts State Wassermann Laboratory‡ has been routinely testing all samples of cerebrospinal fluid by this method, provided there was sufficient fluid remaining after the Wassermann test had been performed. The present study is based on the results of 2110 consecutive, simultaneous Davies-Hinton and Wassermann tests done at the Wassermann Laboratory on the cerebrospinal fluids of patients in the Boston City Hospital from 1936 to 1938.

There was agreement between the two tests on 2052 occasions (97.2 per cent) and disagreement on 58 (2.8 per cent), as shown in Table 1. The

TABLE 1. *Comparison of Davies–Hinton and Wassermann Tests on 2110 Cerebrospinal Fluids.*

RESULTS	NO. OF FLUIDS
Both tests negative	1896
Both tests positive	152
Both tests doubtful	4
Total agreements	2052
Davies–Hinton positive / Wassermann negative	30
Davies–Hinton positive / Wassermann doubtful	21
Davies–Hinton doubtful / Wassermann negative	5
Davies–Hinton negative / Wassermann doubtful	2
Total disagreements	58

Wassermann reaction was positive in 152 fluids, doubtful — that is positive only in 2 cc. of the fluid — in 27 and negative in 1931. On these same fluids the Davies-Hinton test was positive in 203, doubtful in 9 and negative in 1898. The Davies-Hinton test was positive in every fluid in which the Wassermann reaction was positive. Disagreement between the two tests occurred only in those fluids in which the Wassermann reaction was doubtful or negative. The Davies-Hinton test was positive in 51 fluids in which the Wassermann test was negative (30 fluids) or doubtful (21 fluids). In addition the Davies-Hinton test was doubtful in 5 fluids which gave a negative Wassermann reaction, while there were only 2 fluids with a doubtful Wassermann and a negative Davies-Hinton reaction.

TABLE 2. *Analysis of the Disagreements between the Davies–Hinton and Wassermann Reactions on the Cerebrospinal Fluid of 50 Patients.*

RESULTS	NO HISTORY OF TREATMENT	TREATED FOR LATENT OR SYSTEMIC SYPHILIS	TREATED FOR NEUROSYPHILIS
Davies–Hinton positive / Wassermann negative	9*	9	10
Davies–Hinton positive / Wassermann doubtful	2†	3	11
Davies–Hinton doubtful / Wassermann negative	2	1	2
Davies–Hinton negative / Wassermann doubtful	0	1	0
Totals	13	14	23

*Davies–Hinton positive and Wassermann doubtful in three subsequent fluids from 1 of these patients.

†Two subsequent examinations of the fluid in 1 patient resulted in one positive and one negative Davies–Hinton and two doubtful Wassermann reactions.

It is clear that in assessing the relative value of the two tests a careful analysis of these 58 disagreements is essential. It was found that the 58 specimens came from 50 different patients, whose records were therefore carefully reviewed (Table 2). These patients fell into three main groups: those with no known history of having received antisyphilitic treatment (13 patients); those who had been treated for primary, secondary, tertiary or latent syphilis with no clinical evidence of involvement of the central nervous system (14 patients); and those who had been treated for syph-

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‡The authors are indebted to Dr. W. A. Hinton, director of the Massachusetts State Wassermann Laboratory, for reporting the results on all fluids from the Boston City Hospital.

ilis of the central nervous system (23 patients). Since 37 of these 50 patients had received antisyphilitic treatment and since at least 1500, and probably nearer 1700, of the entire series of tests were in apparently nonsyphilitic subjects, it is at once clear that disagreements occurred more than ten times as often in patients under treatment as in the remainder of the group. But a consideration of Table 3 yields an even more striking result.

TABLE 3. *Disagreement between the Davies–Hinton and Wassermann Reactions on the Cerebrospinal Fluid of 13 Patients with No History of Treatment for Syphilis.*

CASE NO.	DAVIES–HINTON REACTION	WASSERMANN REACTION	SPINAL-FLUID PROTEIN	SERUM HINTON REACTION	DIAGNOSIS
			mg./100 cc.		
1	Positive	Negative	618	Unknown	Cerebellar hemorrhage
2	Positive	Negative	103	Positive	Subdural hematoma
3	Positive	Negative	70	Positive	Brain tumor (verified)
4	Positive Positive	Doubtful Positive	Not done	Positive	Meningococcal meningitis
5	Doubtful	Negative	2400	Unknown	Cerebral hemorrhage
6	Positive	Negative	47	Positive	Carcinoma of lip with metastases
7	Positive Not done	Negative Positive	103	Positive	Tabes dorsalis
8	Positive	Negative	16	Unknown	Alcoholism; terminal bronchopneumonia
9	Positive	Negative	31	Positive	Latent syphilis
10	Positive	Negative	Not done	Positive Negative Doubtful	Brain tumor suspect; possible syphilis of the central nervous system
11	Doubtful	Negative	22	Positive Doubtful	Serological syphilis; pyelitis
12	Positive Positive Positive Positive	Doubtful Doubtful Doubtful Negative	22 25	Positive	Tabes dorsalis
13	Positive Positive Negative Not done Not done	Doubtful Doubtful Doubtful Doubtful Positive	29 33	Positive	Tabes dorsalis

All except 3 of the 13 patients with no history of previous antisyphilitic treatment had either consistently or on occasion a positive blood Hinton test. In the exceptions the patients had died before blood for a serological test was taken. Hence if we cannot say that all the disagreements occurred in syphilitic patients, we can at least say that no disagreement occurred in a proved nonsyphilitic patient.

Disagreement of the Tests in Patients with No Previous Antisyphilitic Therapy

The first 5 of the patients in Table 3 (no history of antisyphilitic treatment) had an excess of protein in the cerebrospinal fluid which could be attributed to factors other than syphilis. It is possible that the positive (in 1 case doubtful) Davies-Hinton reaction in the cerebrospinal fluid was due to the presence of serum protein which contained syphilitic reagin. The fluid was frankly bloody in 2 patients owing to cerebral hemorrhage, 1 patient had meningococcal meningitis, 1 a brain tumor, and 1 a subdural hematoma.

Three of the 8 remaining cases with no history of treatment (Table 3) showed clinical evidence of syphilis of the central nervous system (tabes dorsalis). In these 3 cases, the Davies-Hinton reaction was a more reliable aid in diagnosis than the Wassermann reaction, though in 1 case even the Davies-Hinton was negative on one occasion, and in 2 of the 3 cases a positive Wassermann reaction was finally obtained. In the remaining 5 cases in this group there was no clinical or serological evidence in favor of syphilis of the central nervous system except the Davies-Hinton reaction, which was positive in 4 cases and questionable in 1.

To sum up, there was disagreement in 5 patients with no history of antisyphilitic treatment whose fluids were contaminated with serum protein which possibly contained syphilitic reagin. In the 8 remaining patients (13 fluids) the Davies-Hinton reaction was thrice positive and once doubtful in patients with no other evidence of syphilis of the central nervous system, once positive in a patient in whom this diagnosis was doubtful, and once negative in a patient with tabes dorsalis. In the same 8 patients (16 fluids) the Wassermann reaction was twice negative and seven times doubtful in the 3 patients with tabes dorsalis. The most striking difference between the two tests, therefore, is that the Wassermann reaction was never positive or doubtful in any of the patients without other evidences of syphilis of the central nervous system, although it was often doubtful or negative in patients with such evidence, while the Davies-Hinton

TABLE 4. *Disagreement between the Davies–Hinton and Wassermann Reactions on the Cerebrospinal Fluids of 14 Patients with Positive Blood Hinton Tests Who Were Receiving Treatment for Syphilis but Who Had No Clinical Evidence of Syphilis of the Central Nervous System.*

CASE NO.	DAVIES–HINTON REACTION	WASSERMANN REACTION	SPINAL-FLUID PROTEIN	DURATION OF TREATMENT
			mg. per 100 cc.	
14	Positive	Negative	25	5 yr.*
15	Positive	Negative	25	1 yr.
16	Positive	Negative	30	4 yr.
17	Positive	Negative	36	2 yr.
18	Positive	Negative	76	2 yr.†
19	Positive	Negative	27	2 yr.
20	Positive	Negative	40	‡
21	Positive	Negative	51	§
22	Positive	Negative	34	1 mo.
23	Positive	Doubtful	70	2 yr.
24	Positive	Doubtful	21	2 yr.
25	Positive	Doubtful	28	2½ yr.‖
26	Doubtful	Negative	27	2 yr.
27	Negative	Doubtful	25	4 yr.

*Patient had left pyramidal-tract signs.
†Bloody tap: 41,500 red blood cells per cubic millimeter in spinal fluid.
‡No recent treatment, but considerable treatment in past years.
§No recent treatment, but considerable treatment in past years; signs of diffuse encephalomalacia; blood pressure 150/90.
‖Mid-zone gold-sol curve.

reaction was only once negative in a patient with other evidence of syphilis of the central nervous system, although it was several times positive or doubtful in patients without such evidence.

Disagreement of the Tests in Patients Receiving Treatment for Syphilis Other Than Neurosyphilis

Turning now to the 14 patients (Table 4) who had received or were receiving treatment for systemic syphilis we note that in 1 of them (Case 18) the positive Davies-Hinton reaction was possibly due to the presence of blood containing syphilitic reagin in the cerebrospinal fluid resulting from a bloody tap. Of the 13 other cases, 3 with a positive Davies-Hinton reaction had an increased spinal-fluid protein or abnormal colloidal gold reaction. The Wassermann reaction was negative in one and questionable in two of these three fluids. This leaves 10 cases without supporting evidence of neurosyphilis, in which the Davies-Hinton reaction was positive in 8, questionable in 1 and negative in 1, while the Wassermann reaction was negative in 8 and questionable in 2. It should be mentioned here that in the 1 case in which the Davies-Hinton reaction was negative and the Wassermann reaction questionable, a subsequent lumbar puncture eight months later showed a negative Wassermann reaction.

Disagreement of the Tests in Patients under Treatment for Syphilis of the Central Nervous System

The final group of patients (Table 5) is composed of those who had received or were receiving treatment for known syphilis of the central nervous system. A comparison of the two serological reactions here yields results quite comparable to those found in the previous groups. Of the 10 cases in which the Davies-Hinton was positive and the Wassermann reaction negative, 3 showed other signs of continued activity of the syphilitic process. Of the 11 cases with the Davies-Hinton reaction positive and the Wassermann reaction doubtful, 4 showed other signs of activity. Neither of the 2 patients with questionable Davies-Hinton and negative Wassermann reactions had any other evidence of activity of the infection. Thus there were no cases with other signs of activity in which the Davies-Hinton reaction was negative, but 14 cases with positive Davies-Hinton reactions as well as 2 in which the reaction was doubtful had no other signs of activity. On the other hand, the Wassermann reaction was negative in 3 and questionable in 4 cases in which there were other signs of continued activity, even though it was never positive in a case in which there were no other signs of activity.

DISCUSSION

Let us now consider what light this material throws on the relative value of the Wassermann and Davies-Hinton reactions in the cerebrospinal fluid, first diagnostically, and second as criteria of therapeutic progress or success.

In order to make the diagnosis of syphilis of the central nervous system, one has to answer affirmatively two questions: Has the patient syphilis? Is there sufficient evidence that the disease has involved the central nervous system? In most cases, of course, the answer to these questions is relatively simple. Occasionally it may be most difficult or even controversial.

In the 50 cases under consideration in which there was a disagreement between the Davies-Hinton and Wassermann reactions on the cerebrospinal fluid, the diagnosis of syphilis of the central nervous system had been previously established in 23. If in addition we exclude the 6 cases in which the positive cerebrospinal-fluid test was presumably due to the fortuitous presence of blood protein (with positive serum tests) in the cerebrospinal fluid, we have left 21 cases (27 tests)

Table 5. *Disagreement between the Davies–Hinton and Wassermann Tests on the Cerebrospinal Fluids of 23 Patients Receiving Treatment for Syphilis of the Central Nervous System.*

CASE NO.	DAVIES–HINTON REACTION	WASSERMANN REACTION	DIAGNOSIS	DURATION OF TREATMENT	OTHER SIGNS OF ACTIVITY OF NEUROSYPHILIS
				yr.	
28	Positive	Negative	Vascular neurosyphilis	3	Increased protein in fluid
29	Positive	Negative	Tabes dorsalis	1	None
30	Positive	Negative	Tabes dorsalis	2	None
31	Positive	Negative	Tabes dorsalis	3	None
32	Positive	Negative	Asymptomatic neurosyphilis*	2	None
33	Positive	Negative	Tabes dorsalis	4	Lightning pains
34	Positive	Negative	Dementia paralytica	2	Increased protein in fluid
35	Positive	Negative	Vascular neurosyphilis	2	None
36	Positive	Negative	Tabes dorsalis	1	None
37	Positive	Negative	Tabes dorsalis; optic atrophy	2	None
38	Positive	Doubtful	Dementia paralytica	3	First-zone gold-sol curve
39	Positive	Doubtful	Tabes dorsalis	1	None
40	Positive	Doubtful	Taboparesis	1	None
41	Positive	Doubtful	Tabes dorsalis	2	Increased protein in fluid
42	Positive	Doubtful	Asymptomatic neurosyphilis*	1	First-zone gold-sol curve
43	Positive	Doubtful	Tabes dorsalis	3	None
44	Positive	Doubtful	Dementia paralytica	1	None
45	Positive	Doubtful	Dementia paralytica	2½	None
46	Positive	Doubtful	Dementia paralytica	3	First-zone gold-sol curve
47	Positive	Doubtful	Tabes dorsalis	1	None
48	Positive	Doubtful	Asymptomatic neurosyphilis*	1	None
49	Doubtful	Negative	Tabes dorsalis	3	None
50	Doubtful	Negative	Tabes dorsalis	2	None

*Diagnosis based on abnormalities found in specimens of cerebrospinal fluid removed six months to several years previously.

in which there was a diagnostic problem. The answer to the first of the two questions we have to ask is relatively simple. Thirteen of the patients were treated syphilitics, 7 others were diagnosed as having syphilis on the basis of blood tests obtained at the time of the lumbar puncture in question and in the remaining patient no blood test was obtained. We may say, then, that in none of these cases in which information was available were there positive or questionable spinal-fluid Wassermann or Davies-Hinton reactions in the absence of systemic syphilis.

We now come to the question of the relative reliability of the two tests in indicating the presence or absence of involvement of the central nervous system. Heretofore it has been assumed that the presence of even a doubtful Wassermann reaction in an otherwise normal cerebrospinal fluid from a patient with syphilis but with no signs or symptoms of syphilis of the central nervous system was sufficient for the diagnosis of asymptomatic neurosyphilis. The question is now added: Does the occurrence of a positive or doubtful Davies-Hinton reaction under these circumstances have the same diagnostic importance? Unfortunately this cannot be answered as yet.

Turning to the relative value of the two reactions as therapeutic criteria, we see that in each of the cases in Table 5, all of which had at some time previously shown a positive Wassermann reaction in the cerebrospinal fluid, the Wassermann reaction under treatment became negative or doubtful while the Davies-Hinton reaction remained positive, or, as in the last 2 cases in the group, lagged behind the Wassermann reaction in the transition to negativity. Pursuing the problem somewhat further and more rigorously, we find that in the entire series of 2110 tests the spinal fluid Wassermann reaction had become negative in 41 of the approximately 200 patients who were under treatment for syphilis of the central nervous system. In these cases the Davies-Hinton reaction was negative in 29, doubtful in 2 and positive in 10. In other words, in nearly one third of all the cases in which the spinal-fluid Wassermann reaction had become negative, the Davies-Hinton was known to have lagged behind the Wassermann reaction in the transition to negativity.

It would appear, then, that in the treatment of syphilis of the central nervous system the Davies-Hinton reaction tends to become negative either simultaneously with or subsequently to the Wassermann reaction. The question naturally arises, if the latter is the case, whether treatment should be continued until the Davies-Hinton reaction also becomes negative. One can only say at present that sufficient data are not available to enable one to answer this problem definitely. However, it is of interest to note that 4 of the cases with other signs of activity had a doubtful Wassermann reaction and 3 actually had a negative Wassermann reaction. The Davies-Hinton reaction, on the other hand, was invariably positive in this group when other signs of activity were present.*

*Since the completion of this study we have encountered a case in which the fluid gave a doubtful Wassermann reaction and a negative Hinton reaction. This fluid was from a patient with absent ankle jerks and a history of treatment for positive blood tests ten years previously at another hospital. The only other abnormal finding in the spinal fluid of this patient was the presence of 15 white blood cells per cubic millimeter. The total protein and the colloidal gold reaction were normal.

SUMMARY AND CONCLUSIONS

Of 2110 consecutive, simultaneous Davies-Hinton and Wassermann reactions on the cerebrospinal fluid there was agreement in the results of the tests in 97.2 per cent and disagreement in 2.8 per cent.

Fluids with a positive Wassermann reaction always showed a positive Davies-Hinton reaction. In all but 2 of the cases of disagreement the Davies-Hinton was more positive than the Wassermann reaction.

No disagreements were found in nonsyphilitic patients.

A positive Davies-Hinton reaction was often found in syphilitic patients under treatment with no other signs of syphilis of the central nervous system, while a negative Wassermann reaction was not infrequent in patients with signs and symptoms of activity in the central nervous system.

In patients under therapy for syphilis of the central nervous system the Davies-Hinton reaction often remains positive or doubtful in the spinal fluid after the Wassermann reaction has become negative, and rarely if ever disappears before the Wassermann reaction.

The questions are raised whether the occurrence of a positive or questionable Davies-Hinton reaction in the cerebrospinal fluid of a patient with no signs or symptoms of syphilis of the central nervous system is sufficient for a diagnosis of asymptomatic neurosyphilis; and whether the treatment of patients with syphilis of the central nervous system should be continued until the Davies-Hinton reaction has become negative. It is concluded that neither of these questions can be adequately answered at present, but some evidence is adduced for an affirmative answer to the latter.

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INADEQUACY OF INJECTION TREATMENT OF HERNIAS*

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THIS paper is concerned with the end results of a four-year study of 20 patients who were treated for inguinal hernia by the injection method. Interest in this method was revived in 1930 by Mayer,[1] who reported 98 per cent cures in 2100 cases. His results were confirmed by Bratrude[2] in 1937, but Burdick's[3] report in 1937 on 92 patients followed for two years showed failure in all but 3 per cent.

Approximately 50 patients in the clinic began the treatment, but only 20 continued through a full course; the others were forced to stop either because of pain following the injections, the annoyance of wearing a truss continuously day and night or occasional untoward reactions. A full course of treatment consisted of some twenty injections, a week or more apart, the number varying from case to case. Adequate treatment was considered to have been achieved when complete fibrosis of the canal was present, the patient could comfortably dispense with the truss and no impulse was detectable. Of the 20 patients, who varied from twenty-eight to seventy-five years of age, 10 had direct and 10 indirect hernias. Mayer's solution was used in 11 cases, Sylasol in 5 and Tripoli suspension in 4. All these patients were considered cured at the time of discharge, which occurred at intervals varying from one to two years. The follow-up observation period in all of them began two years after the first injection. Table 1 shows the end results after a two-year follow-up period.

TABLE 1. *End Results.*

FOLLOW-UP PERIOD	HERNIA PRESENT	HERNIA ABSENT
2 yr. and 3 mo.	0	20
2 yr. and 6 mo.	4	16
2 yr. and 9 mo.	6	14
3 yr.	8	12
3 yr. and 3 mo.	12	8
3 yr. and 6 mo.	17	3
4 yr.	18	2

The two apparent cures were in one patient with a small indirect hernia and another with a moderate-size direct hernia. Of course, recurrence even in these may well occur later. Recurrences, according to some observers, are considered to be due to an inadequate number of injections, but in many of our cases the recurrences were so complete and occurred so soon after what appeared to be an adequate degree of fibrosis that a whole new course of treatment would have been required.

Complications were few. Two patients were in shock for several hours after treatment, requiring morphine and emergency-ward care. Five had painful cords which persisted for three to five weeks. Nearly every patient had some local pain; in 2 cases the patients could not resume work for several days. Two patients had to have emergency treatment for a strangulated hernia, repair of which was more difficult because of the fibrosis and inflammatory reaction.

There are obvious reasons why the injection treatment is likely to fail: the plane of injection is frequently more a matter of conjecture than positive knowledge; so long as the inner lining of the sac is not obliterated the intraperitoneal pressure will sooner or later force the sac through the fibrous tissue, which, like fibrous tissue anywhere, may stretch readily under tension; injection into the sac itself, even if possible, is not advisable because of peritoneal reaction and shock.

SUMMARY

Twenty patients with hernias were treated by the injection method and carefully followed. At the end of four years 2 patients were cured.

We believe that the injection treatment of hernias is not satisfactory and should be used only when the patient must not be operated on, and then only after the method of treatment and its potentialities for cure have been fully explained to the patient.

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REPORT ON MEDICAL PROGRESS

REGIONAL ANESTHESIA*

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RECENT developments in anesthesia are characterized chiefly by evaluation and selection of methods which the last decade has yielded. One outstanding manifestation of change is the emergence of spinal anesthesia as the most useful type of regional anesthesia; another is the demonstration of its practicability as a substitute for general anesthesia. Methods of regional anesthesia, except those of spinal block, have changed but little. There has been a tendency to substitute the newer forms of spinal block for other forms of regional anesthesia, so that consideration of this subject becomes a discussion of the present status of spinal anesthesia.

GENERAL CONSIDERATIONS

No other anesthesia so easily provides widespread muscle relaxation, intestinal quiet and easy recovery as does regional anesthesia. The amount of drug required is extremely small. Preliminary medication is essential to complement the anesthesia by lessening annoyance, inducing psychic calm and dimming memory. This should include a barbiturate to counteract the rare toxic manifestations of the anesthetic. Toxic manifestations, if invoked, occur early and steadily subside. It is not generally believed that there is any advantage in using mixtures of anesthetic drugs.

The usual practice restricts spinal anesthesia to operations below the diaphragm, although it can safely be used by some for intrathoracic surgery. Above the level of the clavicles it produces almost complete paralysis of respiration, and for operations on the neck and head it seems wholly undesirable.

Facilities for providing artificial respiration and supplementary anesthesia must always be available. Spinal anesthesia can prove difficult, even disastrous, for an inept user, and a surgeon cannot safely assume responsibility for both the anesthesia of and the operation on the same patient. The contraindications are really no more than those which apply to all anesthetics, except that children less than seven years old are more manageable under general anesthesia.

The principal disadvantages, in order of their relative importance, are: necessity for observation of the patient throughout operation by a physician thoroughly familiar with the problems of spinal anesthesia; possible occurrence of nausea and vomiting; possible premature termination of anesthesia; possible respiratory paralysis; possible circulatory collapse; possible neurologic sequelae.

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PHARMACOLOGICAL CONSIDERATIONS

Investigations[1, 2] on rabbits have resulted in the following appraisal of the principal drugs:

Concentration in spinal fluid required to effect minimal anesthesia:

Pontocaine	0.05 per cent
Nupercaine	0.07 per cent
Tutocain	0.50 per cent
Metycaine	0.86 per cent
Procaine	0.90 per cent

Minimal lethal concentration in spinal fluid:

Nupercaine	0.8 per cent
Pontocaine	1.5 per cent
Metycaine	3.5 per cent
Tutocain	6.0 per cent
Procaine	6.0 per cent

Safety ratio (lethal dose to anesthetic dose):

Metycaine	4:1
Procaine	7:1
Nupercaine	11:1
Tutocain	12:1
Pontocaine	30:1

Duration of anesthesia from minimal anesthetic concentrations:

Tutocain	11 minutes
Metycaine	13 minutes
Procaine	16 minutes
Pontocaine	25 minutes
Nupercaine	41 minutes

INTRATHECAL DYNAMICS

The specific gravity of normal spinal fluid varies from 1.001 to 1.009. Procaine in spinal fluid forms a solution only slightly heavier than the spinal fluid.[3] Its spread in this form depends more on the manner of injection than on gravitational effect.[4] Because the specific gravity of spinal fluid is not constant, there can be no constant difference between it and the specific gravity of a ready-made solution. If the specific gravity of the anesthetic solution is within the range of that of spinal fluid, the behavior of the former when mixed with the latter cannot be predicted unless actual tests have

established the nature of the dissimilarity. Such tests have been described,[4, 5] but they seem almost too delicate for routine clinical use. Unless thus tested, however, such a solution as 1 per cent Pontocaine (specific gravity 1.007) behaves unpredictably as an anesthetic, since it may be either heavier or lighter than the spinal fluid.

Anesthetic practice indicates increasing preference for solutions with specific gravities quite distinct from that of spinal fluid. Both the light and the heavy solutions can be made to move or remain stationary by appropriate changes in the patient's position.

Of spinal anesthetics, Pontocaine appears to excel in safety and Nupercaine in duration of effect. Measures which provide control of the effects of these drugs have greatly increased the possibilities of spinal anesthesia, and have made it possible to discard other drugs previously used.

Anesthetic Agents

Procaine

Much of the adverse opinion of spinal anesthesia has arisen from experience with procaine. "Had we been limited to procaine," says Heard,[4] "we too would have abandoned spinal in large measure, certainly for any procedure over one hour, or requiring more than 150 mg."

Nupercaine

Nupercaine is the anesthetic of choice for a lengthy operation. Its effect lasts for two and a half to four hours. Compared with procaine, it produces less circulatory depression and provides prolonged motor anesthesia.[4, 6]

A light solution of Nupercaine is preferred because of the ease with which it is concentrated at a high level, and the freedom with which the Trendelenburg position can be employed at the onset of the operation. The hypobaric solution is obtained by high dilution (1:1500) of the drug in 0.5 per cent saline solution, which gives it a specific gravity of 1.003. It is therefore not invariably lighter than spinal fluid, but since 80 per cent of spinal fluids show specific gravities ranging from 1.004 to 1.007, it is usually so. Cases of its proving heavier than spinal fluid have been reported.[4] In order to avoid this exceptional fault of Nupercaine, it is now being made in a solution with a specific gravity of less than 1.001, and solutions even lighter than water have been devised.

Etherington-Wilson[7] found that in glass tubes "simulating spinal canals" the rate of ascent of samples of Nupercaine of varying lightness, depends on the angle of inclination, the volume of injectum, the speed of injection, the temperature of the injectum and the difference in the specific gravities of the samples. The vertical position, he found, gives a slower rise than an inclined position near the vertical, and he recommended that the injection be made with the spine perfectly erect, that is, with the patient seated. With the injection made through the third lumbar interspace, his dosage amounts and time intervals are: for low anesthesia 10 cc., twenty seconds; for medium anesthesia 12 cc., thirty seconds; for high anesthesia 15 cc., forty seconds.

Ordinary experiences demonstrate that such a solution rises more slowly when the inclination of the spine is less than forty-five degrees from the horizontal than when it is vertical or nearly so. Practitioners in this country prefer a technic which employs this principle and allows more leisurely administration of the anesthetic than does that of Etherington-Wilson. Such a technic was proposed by Jones,[8] and as modified by Woodbridge[9] provides satisfactory and safe anesthesia. It prescribes a dosage proportional to the patient's height; injection with the patient in a horizontal position; immediate change to the prone position, with the upper chest elevated so that the spine slopes upward from the site of injection to about the fourth thoracic vertebra, and downward cephalad from that vertebra; frequent testing in order to ascertain the progress of the anesthesia, which if slow in developing may be accelerated by increasing the slope; and limiting the anesthesia to the desired height by adopting the Trendelenburg position when that height is reached.

The advantages of this technic are these: four to ten minutes, rather than a few seconds, is available for manipulating the anesthetic; the "bubble" behavior of the Nupercaine permits a considerable degree of control; the prone position brings the most intense anesthetic effect to bear on the sensory roots; and one avoids the erect position, which, especially when the patient has been heavily medicated or has deficient powers of circulatory adjustment, is conducive to vascular collapse.

The disadvantages of light Nupercaine are as follows: the large amount of solution (16 to 20 cc.) used and the advisability of having it warm; the relatively slow anesthetizing action; the use of the prone position, which may embarrass respiration or aggravate vascular collapse in obese, arteriosclerotic or debilitated patients (although probably less than does the vertical position); and the occasional case in which the spinal fluid is lighter that the Nupercaine solution.

Such drawbacks keep Nupercaine from being the most serviceable anesthetic for routine use, but when prolonged spinal anesthesia is required it is the drug of choice.

Pontocaine

The development of means of creating a heavy solution of a spinal anesthetic constitutes one of the noteworthy contributions to the progress of spinal anesthesia. Pontocaine solution, made heavy by the addition of 10 per cent dextrose solution, as proposed by Sise,[10] provides unequaled anesthesia for routine use.

Pontocaine, as compared with procaine, is reported as causing less depression of blood pressure,[5] less nausea and vomiting[9, 11] and fewer postoperative complications and neurologic sequelae.[5, 11] Although approximately four times as toxic as procaine, Pontocaine is approximately eighteen times as potent, and therefore gives more intense anesthesia in a dose approximately one tenth that of procaine.

The dosage varies from 8 to 20 mg. (0.8 to 2.0 cc. of a 1 per cent solution). Abdominal anesthesia in children is obtained with a dose of 1 mg. per year of age. The volume of dextrose solution used is always at least equal to the volume of Pontocaine solution; a larger proportion is frequently advisable. Individualization of dosage is possible because the gravity effect persists for several minutes, and varies according to the proportion of dextrose added and the degree and duration of slope adopted. The following cases are illustrative. (1) Sixteen to 20 mg. of Pontocaine, plus 3 cc. of dextrose solution, injected with the patient in the Trendelenburg position, immediately flows cephalad. By following its progress with testing the anesthesia, and appropriately maneuvering the slant of the table, the Pontocaine is quickly concentrated in the thoracic area and permits upper abdominal surgery for one and a quarter to two hours. (2) Twelve to 20 mg. (1.2 to 2.0 cc.) of Pontocaine, plus one and a half times as much dextrose solution, injected with the patient level, stagnates around the point of injection and the mixture begins to dissipate. The effect of the Trendelenburg position is then more sluggish, and under it the anesthesia rises slowly and is concentrated in the lower thoracic and lumbar areas, permitting initial abdominal palpation, then lower abdominal and pelvic surgery for one and a half to two and a quarter hours. (3) Eight to 20 mg. of Pontocaine, plus 3 cc. dextrose solution, injected with the patient in the reverse Trendelenburg position, flows caudad. Maintaining the position concentrates the anesthesia in the lower lumbar and sacral area, and permits operation on the lower urinary tract, external genitalia, perineum and lower extremities for as long as three hours.

The mobility of heavy Pontocaine makes it dangerous unless the cervical spine and head remain higher than the level of injection. But this very mobility also makes it the most efficient of spinal anesthetics, capable of ready manipulation during induction and thereafter readily controllable. It enables the anesthetist to vary his methods according to his problems, and makes possible precise placing of anesthesia. The practitioner who always employs the same dose and technic lacks versatility as much as does the surgeon who knows but one method for approaching a surgical problem.

Sequelae Attributable to Spinal Anesthesia

Untoward effects from spinal anesthesia are becoming less frequent. The principal sequelae now seen, headache, backache and "neuritis," are really those of lumbar puncture. Headache, usually caused by seepage of spinal fluid from the dural wound, is minimized by using a fine needle (24-gauge), making a single puncture and avoiding elevating the head for twenty-four hours. Merely using a fine needle so nearly abolishes headache that patients can comfortably become ambulatory within twenty-four hours.[12] The backaches for which spinal anesthesia can be considered responsible result chiefly from trauma to the periosteum, and may be considerably reduced by careful technic. Backache due to positional strains during operation may develop under any type of anesthesia. "Neuritis" more frequently results from trauma than from drug action. Accurate midline punctures avoid the posterior roots except when, owing to disease or anomaly, there is abnormal fixation of the cauda. Neuritis thus produced by trauma subsides within ten to twenty days unless excessive injury is inflicted.

Complications such as cranial nerve palsies and degenerative cortical lesions have been described.[13] Schreiber[14] states the modern viewpoint when he ascribes such lesions to cortical anoxia rather than to drug effect, and declares that they are preventable. Similar lesions are seen following nitrous oxide anesthesia with anoxemia.

Peripheral palsies (foot drop and so forth) appear to be most frequent after procaine anesthesia, possibly because highly concentrated solutions of that drug are often used. Lundy et al.[15] showed that concentrations of procaine above 17 per cent are highly destructive to nervous tissues. There appear to be very few, if any, cases of permanent paralysis resulting from the use of Pontocaine or Nupercaine.

Lehman et al.[16] report that patients termed "spinal cases," as compared with "ether cases," convalesce with less nausea, vomiting, distention, headache, backache and general discomfort. Decisive data on pulmonary complications are not available, but

it appears that operations under all anesthetics, including local infiltration,[17] are followed by about the same incidence of pneumonitis and atelectasis. Concurrent or recent infections of the respiratory tract, decreased pulmonary aeration because of pain and clinostatic blood stasis contribute more to their occurrence than does anesthesia.

Effects on Circulation

In probable order of importance, the circulatory mechanisms affected by spinal anesthesia are paralysis of sympathetic vasoconstrictors, loss of massaging action of skeletal muscles, decreased respiratory pumping effect and, under abnormally high anesthesia, respiratory paralysis leading to anoxemia, which unless oxygen is administered leads to respiratory depression and secondary vascular collapse. Seevers and Waters[18] have stated that spinal anesthesia extending up to the midthorax invariably produces enough impairment of respiration to prevent adequate oxygenation of body tissues unless additional oxygen is supplied.

Of these effects, the second and third occur under general anesthesia and are inevitable. The first and fourth, which characterize spinal anesthesia particularly, must be taken into consideration with every administration of a spinal anesthetic.

The hypotension of spinal anesthesia results in large part from extensive vasomotor paralysis, for it does not occur in sympathectomized animals.[19] Its features are quite different from those resulting from shock or hemorrhage. In the case of shock, trauma produces "toxins" or abnormal nerve impulses which cause paralysis and dilatation of the capillaries and venules, an increased endothelial permeability with transudation of plasma, and increased capacity of the vascular system. There follows a generalized compensatory vasoconstriction, which is more or less effective in maintaining blood pressure until vasomotor exhaustion occurs. In hemorrhage, there is blood loss, leading to decreased blood volume, passage of tissue fluids into the blood and compensatory vasoconstriction as in shock. Under spinal anesthesia, vasomotor paralysis at the onset leads to increased capacity of the vascular system, and a more or less effective effort of the uninterrupted portion of the vasomotor mechanism to compensate therefor. Hence, spinal hypotension is not analogous to shock, for vasoconstriction is maximal at the onset of shock, but minimal, because of paralysis, at the onset of spinal anesthesia. Vasoconstricting drugs are unavailing in shock, but are beneficial in spinal hypotension. CoTui[20] found the usual therapy for shock (infusion and transfusion) ineffective in spinal hypotension and vasoconstrictors the only efficacious remedy. He also found that while in cases of shock the Trendelenburg position relieves the respiratory depression and restores circulation, in spinal hypotension it accomplishes little.

Even gentle manipulation of the abdominal organs almost inevitably stimulates the shock reflex, and the patient under spinal anesthesia shows a tendency to develop shock unless specifically protected against it by administration of vasoconstrictor drugs. In adequate doses these wholly abolish spinal hypotension, and when no shocking reflexes are invoked by the operation, normal blood pressure is readily maintained throughout the duration of the anesthesia. If shock develops, vasoconstrictors are needed to enable the paralyzed vasomotor mechanism to exercise its normal protective influence.

If it seems that undue emphasis is being given here to the matter of circulatory changes, the reason is that increasing knowledge of this matter makes possible the extensive application of spinal anesthesia which is here advocated.

Vasoconstrictor drugs

Constant use of ephedrine demonstrates frequent side effects: palpitation, tachycardia, stenocardia, arrhythmia, nausea and retching. Neosynephrin hydrochloride, in a dose of from 1 to 3 mg., is an equally potent pressor substance and appears virtually incapable of upsetting the patient. It typically makes the pulse slower and stronger.

A notion prevails that vasoconstrictors become ineffective after the blood pressure has fallen. Actually, however, because the circulation is inefficient in hypotensive states, the lack of pressor response is chiefly due to delayed passage of the drug from the site of injection into the blood stream. Vigorous massage of the hypodermic deposit almost always promotes a good response, and such massaging should be conducted until evidence of absorption is noted.

Adrenalin is intended by Nature to act in brief emergencies rather than over extended periods, and is a relatively poor vasoconstrictor. It often causes tachycardia, especially when the cardioinhibitors have been paralyzed by scopolamine.

Whether the anesthetic itself conditions the vasoconstriction is unknown. The presence of cocaine in a smooth-muscle cell is known to augment the adrenalin effect, abolish the ephedrine effect, and fail to change the Neosynephrin effect.[21] If future work shows that our spinal anesthetics resemble cocaine in this respect, we may have a more logical basis for selecting vasoconstrictor drugs.

An ephedrine-Pitressin mixture has found some favor. Pitressin, however, is a dangerously potent

coronary constrictor.[22] Simultaneous administration of ephedrine apparently neutralizes this property,[23] but Pitressin might well be omitted, lest the unwary, ascribing to it some particular virtue, err in using it without the ephedrine.

Contraindications

The contraindications of spinal anesthesia have so decreased that now, if it be appropriate for use during the proposed operation, some surgeons and anesthetists with large experience believe that is the method of choice regardless of the condition of the patient.[24, 25]

The traditional infiltration anesthesia for poor-risk patients compares unfavorably with spinal anesthesia for these reasons: the longer time needed for induction; the larger amount of drug injected; the inconvenience and danger of multiple injections; the possibility of intravenous injection; the difficulty in obtaining complete anesthesia; the brief duration of anesthesia; the fact that shock reflexes are still provoked by pain and manipulation of viscera; the failure to reduce intestinal distention; the possibility of evisceration during retching or vomiting; and the difficulty of placating the patient made uncontrollable by operative distress.

The patient in shock is a poor-risk patient, but if his blood pressure is still adequate, vasoconstrictors will maintain it under spinal anesthesia. If on the other hand vasomotor collapse has already occurred, spinal anesthesia can hardly make the situation worse. It is known that strong pain stimuli are a factor in causing shock, and O'Shaughnessy and Slome[26] found spinal anesthesia the only measure capable of raising blood pressure in animals in shock from severe trauma to the lower extremities.

Under inhalation anesthetics, internal respiration is impaired to whatever extent the blood is compelled to transport anesthetic rather than oxygen and carbon dioxide. When tissue vitality is low, as in shock, the entire oxygen-carrying capacity of the blood might better be kept available for oxygen-carrying.

For an operation on the poor-risk patient, infusions and transfusions are employed, a vasoconstrictor is administered, then spinal anesthesia, and an oxygen atmosphere is provided to prevent or combat the anoxia of toxemia and vascular collapse. This regime often improves the patient's condition even while the operation is in progress, and seems so rational and advantageous that one regrets that it is not applicable to every situation.

No doubt the most peculiarly unsuitable subject for spinal anesthesia is the patient with severe combined atherosclerosis and arteriolar sclerosis. This disease makes circulatory adjustments inefficient: the arterioles cannot change much in caliber, the aorta cannot initiate normal pressor reflexes, and vasomotor stimulation is relatively impotent. Such persons experience cerebral anoxia (vertigo) even when they rise quickly. They develop shock from minor trauma, for they have no effective vasomotor mechanism to compensate for capillary dilatation and stagnation. Time spent in administering stimulants to such patients when circulatory collapse occurs would be spent much more profitably in administering oxygen and lowering the head.

Faith in various analeptics as panaceas for anesthetic crises is often unfortunate. Stimulants or the time spent in administering them may distract an anesthetist long enough to give the patient time to die, and in a crisis a patient may die with stimulants more quickly than without them, if oxygen alone is administered. Picrotoxin, Metrazol and Coramine are worthless for treating the circulatory or respiratory depression resulting from spinal anesthesia per se[27]; adrenalin may cause death, especially when given in the heroic dose which an emergency easily inspires; Pitressin alone is wholly bad.

* * *

In all operations for which the use of subarachnoid block is appropriate, it has been found to be a suitable form of anesthesia. Its proper conduct requires an anesthetic solution which can be controlled within the spinal canal, and a thorough knowledge of the circulatory-respiratory phenomena which occur under spinal anesthesia, together with facility in handling them intelligently.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 25491

PRESENTATION OF CASE

A forty-year-old garage owner was admitted to the hospital complaining of recurrent episodes of painless jaundice.

Four years before entry the patient's wife first noticed the appearance of jaundice, which gradually deepened and was associated with foul, clay-colored stools, amber-colored urine, generalized pruritus and frequent nosebleeds lasting ten to fifteen minutes each. He also became nervous, irritable and tired and had low abdominal pain following the ingestion of fried foods, cream and ice cream sodas. His appetite, however, remained excellent. There was no right upper-quadrant pain, nausea or vomiting. This apparently passed after a few months, and he was seemingly well until about two and a half years before entry when he was treated by a physician for left otitis media following an upper respiratory infection. At this time it was also noticed that he had marked jaundice, that the liver was enlarged, but not tender and that there was a return of the symptoms which had accompanied his previous attack of jaundice. He was put to bed for six weeks and placed on a fat-free diet with bile tablets. On this regimen, the jaundice, pruritus, nervousness and irritability temporarily lessened, and the liver receded. After returning to work he noted an extraordinary susceptibility to cold, although he denied having chills. Eleven months before admission he noticed, for the first time, a swelling of the left ankle. Six months before entry he could not button his vest over his upper abdomen, his jaundice increased markedly, and he became drowsy much of the time. His ankles and legs became swollen but were normal when recumbent. Clay-colored stools, which waxed and waned in intensity (at times the stools were of normal color), and frequent nosebleeds reappeared and he bruised easily. These symptoms increased gradually so that he had difficulty in pulling his trousers over his legs. He became dyspneic on exertion and was deeply jaundiced, so much so, that on entering an outside hospital for treatment one week later he was given Chinese rice for his first meal by the hospital attendants. At this time he was often awakened at night gasping for breath, with a feeling of tightness and oppression in his chest and of a "filled-up" abdomen. He remained in the hospital for two weeks where he was given digitalis and diuretics, with the result that the peripheral edema markedly decreased and the jaundice lightened. These symptoms recurred on discharge, however, so a few days later he was admitted to this hospital for further study.

The patient had worked in the garage business for fifteen years. Only recently had he used a gasoline which was said to contain 15 per cent benzol. The family and marital histories and the remainder of the past history were non-contributory.

Physical examination revealed a well-developed and nourished, moderately jaundiced man who was in no acute distress. There were a few scratch marks and small ecchymotic areas scattered over the yellow skin. There was a blood crust over a recent bleeding point in one nostril. The neck veins were not distended, and he could lie almost flat without discomfort. The chest was normal, but the diaphragms were high. The heart was percussed 1 to 2 cm. beyond the midclavicular line in the fifth interspace. The sounds were of fair quality, the rhythm regular, and the rate 88. A blowing systolic murmur was heard over the apex and pulmonic area. The blood pressure was 140 systolic, 70 diastolic. The abdomen was bulbous, with "moderate ascites." The liver edge was palpated 6 cm. below the costal margin, but the spleen was not felt. The lower legs and feet were moderately edematous.

The temperature was 99°F., the pulse 88, and the respirations 20.

Examination of the dark amber-colored urine revealed a specific gravity of 1.018, with + albumin and a ++++ bile test; there were rare granular casts, rare red cells and occasional white blood cells in the sediment. One stool was brown and soft-formed; another, gray. The blood showed a red-cell count of 2,920,000 with 8.6 gm. hemoglobin (photoelectric-cell technic), and a white-cell count of 13,900 with 84 per cent polymorphonuclears. The serum bilirubin by the van den Bergh test was 14.4 mg. per 100 cc., biphasic, and the icteric index approximately 90. The serum nonprotein nitrogen was 18 mg. per 100 cc., the serum protein 6.8 gm. The serum chlorides were equivalent to 90.6 cc. of N/10 sodium chloride per 100 cc., and the carbon-dioxide combining power 23.3 cc. of N/10 carbonic acid, both on the thirteenth hospital day. A phenolsulfonephthalein test showed 50 per cent excretion, 30 per cent in the first thirty minutes. An electrocardiogram showed a ventricular rate of 85, with normal rhythm, a low, slightly diphasic T_1, a sagging ST_2,

an inverted T_3 and a low diphasic T_4; R_4 was upright. Roentgenograms of the chest showed high diaphragms and hazy linear densities at both bases. Both costophrenic angles were obliterated by small amounts of fluid. The heart shadow was considerably increased in size, the enlargement being almost entirely in the region of the left ventricle. The aorta was tortuous but showed no evidence of dilatation. The esophagus showed no evidence of varices. The blood Hinton test was negative.

The patient ran an uneventful course, with normal temperature, pulse and respirations, for the first eight days in the hospital, except for pain on defecation and the passage of a few ounces of bright-red blood, which apparently came from slightly enlarged internal and moderately enlarged external hemorrhoidal veins and from two or three small external fissures. The rectum was treated with lubricants and 2 per cent tannic acid compresses, with relief. A bleeding point in the nose had to be cauterized. He was placed on a high-carbohydrate, high-vitamin, high-caloric diet, with bile salts and parenteral administrations of glucose. He was given chloral hydrate, digitalis (1½ gr. twice a day), liver extract (intramuscularly) and thiamin chloride and was transfused.

Attempts to reduce the edema and ascites with Salyrgan were of little success. On the tenth hospital day the temperature, pulse and respirations rose to 100.5°F., 120 and 30, respectively. He became somnolent, very weak and dyspneic. A few rales appeared at both bases. Both spider angiomas and a mousy breath were noticed. He gradually failed, and died on the sixteenth hospital day.

Differential Diagnosis

Dr. Richard J. Clark: I should like to ask if the tortuosity of the aorta and apparent cardiac enlargement may not have been due to high diaphragms.

Dr. Otto Sahler: Yes; the belief was that the heart was not much increased in size. The most important thing from your point of view is that there was no definite evidence of varices in the esophagus.

Dr. Clark: I take it there were no films of the gall-bladder region.

Dr. Sahler: No.

Dr. Clark: Apparently this patient was very sick and not put through a very extensive course of study. I think we may start with the assumption that he had some type of fairly severe liver disease, which eventually proved fatal. One question which arises is the relative importance of the cardiorespiratory symptoms. Did the heart have anything to do with his condition? It probably did not. I think the cardiac enlargement which the patient showed was in considerable part due to the high diaphragms. He may well have had some dilatation and some myocardial weakness as the result of secondary anemia. The electrocardiogram did show some T-wave changes, but these can well be accounted for on the basis of anemia or the digitalis which he had received. I do not believe he had serious coronary heart disease. His blood pressure at the time of entry was quite normal; perhaps it was a little higher than one would expect in a man in a debilitated state, and this makes you wonder if in the past he had had a somewhat elevated blood pressure which may have produced left ventricular hypertrophy of the hypertensive type. We do notice that he was able to lie flat in bed and had no distention of the neck veins, and that is of considerable significance. Whatever he may have had in the heart in this connection is a side issue and had nothing to do with the primary situation.

Let us come back to four years before entry, at the beginning of this history, when we find a man with painless jaundice of the obstructive type, which came on apparently rather gradually; we have no definite clue as to what this was. We might first think of catarrhal jaundice, but it is surprising that he had a good appetite all the way through. We wonder about the possibility of a silent gallstone. I see no reason why this might not explain the primary picture. He might have slipped the stone back into the gall bladder in the course of time or passed it out. On the other hand, the foul clay-colored stools are significant and make me wonder about the pancreas. Were these "pancreatic" stools, and did he have some degree of pancreatitis at that time? He did not have much pain, but in a very low-grade pancreatitis there might be little more than the lower abdominal pain described. The fact that the jaundice continued for several months — we do not know just how long — is more in keeping with a diagnosis of pancreatitis than with that of a stone which had passed.

He then got along fairly well. We are not told whether the jaundice completely disappeared. My guess would be that it subsided largely but that he had some trace left. Two and a half years before entry he developed an acute respiratory infection and at that time was found by a physician to be markedly jaundiced and to have some enlargement of the liver. As the disease progressed we find, about eleven months before entry, evidence of circulatory obstruction — first, a swelling of the legs, and later, ascites. The fact that his vest would not button over the upper abdomen makes me wonder whether it was because of an extremely large liver or ascites. It might

have been either, but I presume it was an indication of developing ascites. From this time on the jaundice remained quite intense, but there was evidence of only intermittent complete biliary obstruction. After he entered the hospital his stools were at times dark and again clay colored; this is a fairly significant fact. In spite of vigorous treatment of the cardiovascular symptoms and the liver disease, he ran a progressively downhill course and died with what apparently was complete liver failure and possibly a terminal pneumonia.

How can we fit this picture together? The first thing we think of is ordinary portal cirrhosis of the Laennec type. Many things make this improbable. He started with jaundice early in the course of the disease and showed marked jaundice before he had ascites, facts which are out of keeping with such a diagnosis. He had no evidence of esophageal varices, no story of dilated veins in the abdomen, no history of alcoholism and no splenic enlargement. In view of these facts I shall rule out ordinary portal cirrhosis.

The next consideration would be Hanot's hypertrophic cirrhosis. This is rather a rare condition and occurs primarily in young people. Statistically he is just under the age limit for this. It is more apt to occur at thirty or under. Hanot's cirrhosis would explain the early deep jaundice which later went on to evidence of portal obstruction. However, in Hanot's cirrhosis I think one is rather more apt to get a progressive, continuous jaundice than an intermittent jaundice. Furthermore, in Hanot's cirrhosis one is apt to get bouts of fever, of which there is no evidence here, and splenic enlargement is almost universal. If we are to believe the physical examination he had no enlarged spleen. It is possible with the ascites that the spleen might have been missed.

Syphilis could produce a picture similar to this, but on the basis of the negative serological test we have to rule this out. Familial jaundice might be considered. It is not infrequently associated with gallstones. Against this is the lack of a family history, the relatively mild anemia and the absence of splenomegaly.

We are told about his occupation, and that he was exposed to benzol but only for a short time. It does not say how long. Certainly the benzol could not have had anything to do with the picture in the beginning. He was a garage man and he might have come in contact with lead. So far as I know lead could not produce this picture. I do not believe garage men are in contact with phosphorus. I am going to dismiss any occupational cause for his disease.

Then one comes down to the conditions which can produce ascites and jaundice without splenic enlargement, and perhaps the most common of these is metastatic cancer of the liver, which is not infrequently from a focus undetermined ante mortem. One might also consider a primary cancer, either in the bile ducts, liver or pancreas, or any one of the lymphomas giving obstruction in the portal area. I shall rule all these things out for the simple reason that the jaundice was intermittent. If he had had any type of tumor which pressed on the bile ducts and caused jaundice, it would be most unlikely for the bile ducts to open up and pass bile on one day and shut down and fail to pass bile on another.

The one condition that I can think of which might produce this picture is the so-called "obstructive type" of biliary cirrhosis, and I believe that is what this man had. I think it may well have been based on a chronic, low-grade pancreatitis and infection in the bile ducts, which had been continuing off and on ever since the first bout four years previously. We might fairly consider whether he had gallstones as well; it would not be at all surprising if this were the case, but we have no positive evidence for them.

In addition to the obstructive biliary cirrhosis, there must have been a secondary generalized fibrosis of the liver giving rise to portal obstruction.

Dr. Tracy B. Mallory: Are there any other suggestions? Dr. Bishop, you saw this patient in life. Have you any comment?

Dr. William A. Bishop: I know more of his history than the record states. He said that his lower abdominal pain always accompanied protrusion of a small hernia in the left inguinal region; this was indirect in type. He was convinced that that was the source of his trouble, but I never believed it could possibly have any bearing on his troubles because he had pain when lying down with the hernia in. He said if he got up in the morning with it out and went to work he was sure to have abdominal pain.

When I first saw him he had a clinically enlarged heart and murmurs, and I wondered if we were dealing with chronic passive congestion. I gave up that idea when we got x-ray films that did not show right-sided cardiac insufficiency. Yet I clung to that explanation for a long time. I thought of cirrhosis of the liver as a possibility. I agree with the speaker on the question of benzol. His only exposure was to a benzol type of gasoline that he was delivering to cars. It is my opinion that garage men — and statistically it has been shown — are not troubled with benzol or lead poisoning from the delivery of benzol or tetralead gasoline; so we ruled out occupation as a cause of his illness.

One or two other things were interesting. When I first saw him in the Concord Hospital he showed edema of the feet and legs and there seemed also to be some fluid in the abdomen but no definite ascites. This disappeared with rest and digitalis, and that lent a little more color to my first impression of cardiac insufficiency. He complained of night blindness and was successfully treated with large amounts of vitamins. He stated that he could stare at a glaring headlight without the dazzling effects that most of us experience. Amber vision was another interesting complaint, which was, of course, connected with his jaundice; that too disappeared while in the Concord Hospital.

DR. MALLORY: Dr. Bishop, will you continue and tell about the peritoneoscopy.

DR. BISHOP: That showed a definite hobnail liver, which seemed to be an adequate explanation for both the portal and biliary obstruction. We still had no clue as to why he had this condition. He was not an alcoholic. In fact he said that the amount of alcohol he had drunk in his life "you could put in your eye."

CLINICAL DIAGNOSES

Cirrhosis of liver, with superimposed acute hepatic failure.

DR. CLARK'S DIAGNOSES

Obstructive biliary cirrhosis.
Secondary portal fibrosis, with ascites.
Hepatic failure.
Chronic pancreatitis.
Cholelithiasis and cholecystitis?
Terminal pneumonia?
Left ventricular hypertrophy?

ANATOMICAL DIAGNOSES

Cirrhosis of the liver, toxic type, with acute hepatitis.
Hypertrophy of the heart, slight.
Splenomegaly.
Bile nephrosis.
Arteriosclerosis, slight aortic and coronary.
Icterus.
Ascites.

PATHOLOGICAL DISCUSSION

DR. MALLORY: This is the type of case in which peritoneoscopy can be very useful. The problem here was whether the disease was purely intrahepatic or whether there was also an extrahepatic element for which surgery might possibly have offered something. The demonstration of a really nodular liver by peritoneoscopy settled the point and obviated any necessity of an exploratory laparotomy.

I personally disagree with the description that it was a hobnail liver. This matter came up a few weeks ago and the question was raised, What is the size of a hobnail? I have never seen hobnails that were more than 4 mm. across. The lumps of nodules on the surface of this liver were much bigger — 1.0 to 1.5 cm. in diameter. Therefore I should rather call it a nodular liver than a hobnail liver. A hobnail liver is very characteristic of alcoholic cirrhosis and is not commonly seen in other types of portal cirrhosis, one of which I think we have to say this man had. His liver was still big at the time of autopsy, weighing about 2000 gm. It was very grossly nodular, and extremely tough and fibrous. On microscopic examination there was extensive cirrhosis with large bands of fibrous tissue containing innumerable bile ducts, the type of picture we frequently see in subacute and acute atrophy. There were foci of progressive acute necrosis in the liver even at the time of death.

There are many things about the case that I do not know how to answer. Whether this had been a steadily progressive process for all four years or whether it occurred in two or more separate and definite episodes, I do not know, though my temptation is to think that it was probably a slowly progressive affair. As to the etiology we have absolutely no lead. Pictures rather like this have been seen in cases of catarrhal jaundice that have been traced through from the acute stage to the final development of severe cirrhosis. Such a course of events is certainly unusual, but there is no question it can happen.

Dr. Clark based part of his argument on the fact that the spleen was not enlarged and there he was misled because the spleen was quite big but had not been felt. It weighed 550 gm. and should have been felt without difficulty. There was only slight hypertrophy of the heart; it weighed 400 gm. The coronary arteries showed a little sclerosis with no significant narrowing. The kidneys, as is customary in jaundiced cases, were considerably enlarged and showed what could be described as bile nephrosis. The lungs showed terminal edema but no significant amount of pneumonia.

DR. RICHARD SWEET: I should like to have you comment a bit on chronic pancreatitis. I have been impressed by the fact that it now enters much less into the differential diagnosis of obstruction of the common duct than it formerly did. Dr. Daniel F. Jones frequently performed biopsies of the pancreas when he thought there was a chronic pancreatitis. Nowadays you hear very little about it.

DR. MALLORY: For some fourteen years we

have been putting through routine sections of pancreas on nearly every autopsy, and we find a chronic pancreatitis in less than 1 per cent of the cases. Of all the various organs of which we make microscopic sections, the pancreas is the least apt to show anything of interest. I personally believe that chronic pancreatitis is an extremely rare condition. It used to be considered relatively common, and I think the probable explanation was that the surgeon, feeling of the pancreas, felt something very hard. He only felt the pancreas on occasions when he was suspicious of it, and the pancreas is much harder than any other organ in the body. The normal pancreas feels as hard as inflamed or almost as hard as neoplastic tissue in any other organ so that it is almost impossible, I think, to make a diagnosis of chronic pancreatitis by palpation.

Dr. Sweet: I think that is quite true and hoped you would bring it out. The other point is, Does it cause long-standing common-bile-duct obstruction? I doubt it.

Dr. Mallory: I am sure it very rarely does. I can conceive of its doing so, however. The relation of the common duct to the head of the pancreas is quite variable. Sometimes the common bile duct is actually buried in the head of the pancreas for a short distance and theoretically could be obstructed.

Dr. Clark: Was there any evidence of inflammation in the lower bile ducts?

Dr. Mallory: No; nothing to suggest it. The gall bladder was negative.

Dr. Edward A. Gall: Do you believe the anemia was the result of liver disease?

Dr. Mallory: I should think so. I do not believe we have to assume any benzol poisoning.

CASE 25492

Presentation of Case

A twenty-four-year-old housewife was admitted to the emergency ward complaining of a severe throbbing headache of three hours' duration.

The patient had been apparently well until nine days before admission when she noted the onset of sore throat and an accompanying severe toothache in the region of the right lower jaw. She consulted a dentist who performed an extraction seven days before entry. There was subjective relief of pain, but until admission the tooth socket continued to ooze blood, in spite of frequent wound packings by the dentist, and the use of a liquid medicine which he had prescribed. Five days before entry the sore throat became more severe, and likewise continued until admission. She was seen by a physician three days before entry who, it was alleged, gave her a small pill every hour "to prevent blood poisoning." Three hours before admission the patient developed a severe headache, associated with a steady decrease in vision.

The patient had been in good health until the present illness. She had two normal children three and four years of age. An appendectomy was done in an outside hospital one year before entry, without undue bleeding. The patient denied the use of drugs of any sort.

Physical examination revealed a sallow, moaning woman who lay restlessly in bed. There were numerous ecchymoses scattered over the body; the largest measured 5 by 5 cm. and was located over the right anterior superior iliac spine. The lips were partially everted, dry and covered with exudate. The gums were swollen and purple, and oozed red blood. The tongue was coated, and the tonsils were huge. There were a few tender shotty cervical lymph nodes. The neck was stiff, but the Kernig sign was negative. There was 1 diopter of papilledema of the left eye, and an absent physiological cup on the right. Examination of the heart, lungs, abdomen and extremities was not remarkable.

The urine was grossly bloody. The blood showed a red-cell count of 2,200,000 with 45 per cent hemoglobin, and a white-cell count of 320,000. The stained smear contained many lymphoblasts; no polymorphonuclear cells were seen.

The patient quickly failed, went into coma and died two hours after admission.

Differential Diagnosis

Dr. John R. Graham: The diagnosis of the fundamental disorder in this case is presented to us in the next to the last paragraph of the history. Here it is stated that the white-cell count was 320,000 and that the stained smear contained many lymphoblasts. This statement combined with the history of generalized purpura, spongy bleeding gums, sore throat, huge tonsils and a rapidly developing, fatal illness in a woman of twenty-four, makes the diagnosis of acute lymphatic leukemia practically certain.

The manner in which death occurred and its cause leaves room, however, for speculation. It is obvious from the severity of the headache, the failing vision and increasing coma and the early choking of the optic disks that the terminal lesion was within the cranium. The extreme suddenness of the onset of headache, the rapidity with which neurologic symptoms and signs developed and the stiff neck are all typical accompaniments of subarachnoid hemorrhage. Such a hemorrhage would fit in well with the severe bleeding

tendency which had already produced generalized purpura and bloody urine. The question arises as to whether the seat of the hemorrhage lay in a leukemic lesion in the brain or whether it occurred in normal brain tissue as a result of the generalized bleeding tendency. Another remote possibility is that she bled from a congenital aneurysm of one of the intracranial vessels. It is impossible to state just which of these mechanisms was responsible for the hemorrhage, but we can be reasonably certain that it was hemorrhage that dealt the terminal blow. Since the hemorrhage was obviously fairly brisk, one is led to think that it probably came from a vessel of fair caliber. If such was the case the walls of the vessel very likely will show leukemic infiltrations. In any event one is fairly safe in predicting leukemic infiltration along intracranial nerve sheaths or vessels in cases of this kind, since it occurs in a very high percentage of them.

Clinical Diagnosis

Lymphatic leukemia.

Dr. Graham's Diagnoses

Acute lymphatic leukemia.
Subarachnoid hemorrhage.
Leukemic infiltration of intracranial nerve sheaths or vessels.

Anatomical Diagnoses

Leukemia, acute lymphatic.
Leukemic infiltration of the meninges.
Normal pregnancy.
Hepatomegaly.
Splenomegaly, slight.
Pharyngitis.

Pathological Discussion

Dr. Tracy B. Mallory: This patient entered the hospital in extremis and died within two hours of entry. It was therefore impossible to work her up very thoroughly, but as Dr. Graham has pointed out, the white count alone was adequate to establish the diagnosis and the only problem was as to the mechanism of death and the distribution of the lesions. One anatomical finding which would unquestionably have been determined clinically by a more complete and leisurely physical examination was that she was between three and four months pregnant. This may or may not have had a bearing on the course or outcome of the disease. The other obvious features of the gross findings were marked enlargement of the liver, moderate enlargement of the spleen and a general lymphadenopathy. Scattered petechial hemorrhages and ecchymoses were present in the internal organs as well as in the skin. On examination of the brain an intracerebellar hemorrhage in the left cerebellar hemisphere was found, with diffuse hemorrhagic infiltrations of the arachnoid over the entire cerebellum. It was not possible in gross to decide whether this was merely a hemorrhage due to the generalized purpuric state or was secondary to a leukemic infiltration of the meninges. Microscopic examination proved the latter to be the case and substantiated Dr. Graham's suspicion of intracranial extension of the leukemic process.

The frequency of central-nervous-system involvement in lymphoma as in leukemia has not been generally recognized. Viets and Hunter[1] reported several cases from this hospital a few years ago in which the lesions were verified at postmortem examination. Somewhat more recently Schwab and Weiss[2] analyzed the clinical records of 334 cases of leukemia and found neurologic signs indicating central-nervous-system involvement in 20.5 per cent.

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The New England
Journal of Medicine

Formerly the
Boston Medical and Surgical Journal
Established in 1828

Owned by the Massachusetts Medical Society and Published under the Jurisdiction of the Committee on Publications

Official Organ of
The Massachusetts Medical Society
The New Hampshire Medical Society
The Vermont State Medical Society

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Subscription Terms: $6.00 per year in advance, postage paid, for the United States; Canada, $7.04 per year; $8.52 per year for all foreign countries belonging to the Postal Union.

Material for early publication should be received not later than noon on Saturday.

The Journal does not hold itself responsible for statements made by any contributor.

Communications should be addressed to the *New England Journal of Medicine*, 8 Fenway, Boston, Massachusetts.

PAYMENT FOR MEDICAL SERVICES

The multiplicity of plans to enable those with low or moderate means to meet the costs of medical care is indicative of the urgency of this problem. Schemes have been devised by insurance companies, consumer groups, physicians and county and state medical societies, particularly within the past few years when economic depression has accentuated so-called "medical indigency" and the financial burden of unpredictable illness and when agencies outside the medical profession have demanded that the problem be recognized and met.

The need for such a provision has been acknowledged by the House of Delegates of the American Medical Association, but nothing official has been said as to the best way of accomplishment, other than the recommendation that any plan should be on a voluntary and cash-indemnity basis. As a matter of fact, it is unreasonable to expect that a single scheme would be suitable for all states, and it seems not unlikely that in the same state a plan devised for an urban population would not be ideally applicable to those residing in a rural community. However, county and state medical societies in numerous states have promulgated medical-service plans, and some are even in operation. One state-wide scheme — that sponsored by the California Medical Association — has not as yet been enthusiastically received by the public. Another — that of the Michigan State Medical Society — is about to be put into operation.

At a special meeting of the Council of the Massachusetts Medical Society, held last spring, action was taken on the recommendations of the Subcommittee on Social Legislation and Insurance relative to plans which had been submitted for consideration to the Committee on Public Relations. By far the majority of the time was taken up with the discussion, and eventual approval, of a plan whereby the Society was to take the initiative in the formation of a corporation, non-profit in character, which would pay the costs of medical care of patients, and the Committee on State and National Legislation and the Committee on Public Relations were authorized to seek legislation providing for a system of medical-cost insurance. The latter step was taken, but the proposed bill was submitted, of necessity, so late in the legislative session that it was refused admission by the Committee on Rules of the Legislature.

Among other things considered at this meeting was the recommendation by the subcommittee that a plan submitted by Health Service, Incorporated, to supply medical care to people whose maximum incomes were not over $3000 a year be disproved. The suggested action was based on three objections: interference with the free choice of physicians; the implication that such medical service would emanate from a certain Boston institution; and the failure of the representatives of the proposed corporation to admit that a fee schedule should be arrived at only after consultation with the local medical societies. The recommendation of the subcommittee was accepted by the Council.

In this issue of the *Journal* appears a state-

ment by five members of the Massachusetts Medical Society relative to the furnishing of medical care to those who subscribe to a prepayment medical-service plan of a charitable corporation — Health Service, Incorporated. If this corporation is identical with the one whose plan was disproved by the Council, — and no statement is made to the contrary, — one may reasonably ask, what steps have been taken to meet the previous objections and why was the presumably revised plan not submitted to the Society for approval?

Be that as it may, the need for some method for the family of low or moderate means to budget for the costs of medical care is paramount, and any plan for filling this need should be welcomed by the members of the medical profession, provided it is legal and ethical. It remains to be seen whether, according to properly qualified authorities, the medical service offered by Health Service, Incorporated, fulfills these conditions. If so, its plan and those of similarly incorporated groups, as possible means of solving one of the most urgent problems with which the medical profession is confronted, should receive the sympathetic interest and the co-operation of physicians.

DEALING IN FUTURES

The world of tomorrow is something which catches the imagination of all of us at some particular time. We like to envisage its planes and its contours, the achievements of science, and the perfections of man which will fashion the terrestrial realm nearer to our idea of Utopia. We hope that the world of tomorrow will be a better place to live in than the world of today — that our experience and that of those who have gone before us will have smoothed out the rough places for our children and for our children's children.

From out of the box of Pandora, disease came to blight the hopes and happiness of mankind. In our world of tomorrow each one of us would want to reduce suffering and illness to the least possible minimum. At this time of year we have an opportunity to be practical about that desire. It is one thing to wish and another to do. Christmas Seals are now on sale, Christmas Seals which have sponsored a movement for many years to bring about a worthy goal — the gradual eradication of tuberculosis. The world of today is still struggling against a powerful enemy in this dread disease; the world of tomorrow need have none of it, if we have a real desire to conquer tuberculosis. Buy Christmas Seals!

MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS AND GYNECOLOGY*

Raymond S. Titus, M.D., *Secretary*
330 Dartmouth Street
Boston

Fatal Puerperal Infection Following Normal Delivery

Mrs. M. D., a twenty-five-year-old para I at term, was admitted to the hospital shortly before midnight on November 28, 1938, in active labor.

The family history was not obtained. The patient's past history was uneventful. Catamenia had begun at twelve and were regular, with a twenty-eight day cycle. Her last period began on February 15, making November 22 the expected date of confinement. Her pregnancy had been supervised in the prenatal clinic and had been entirely normal.

On admission a hasty physical examination showed a well-developed and nourished woman apparently in good health, although her temperature was 100°F. The pulse was of good volume and tension, with a rate of 80. The blood pressure was 120 systolic, 60 diastolic. The throat was normal. The heart was normal; there were no murmurs. The lungs were clear. Abdominal palpation showed a vertex presentation in an LOA position. The fetal heart was heard in the left lower quadrant; the rate was 130. Rectal examination showed the os to be fully dilated and the head at the outlet.

The patient delivered herself normally of a 6 pound, 12 ounce, living female child at 12:15 a.m., November 29. The placenta followed ten minutes later and appeared to be intact. A second-

*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

degree laceration was repaired with No. 2 chromic catgut. The patient was put to bed in good condition, with the temperature still 100°F.

The temperature had dropped to 99°F. the following morning, but rose again to 100 that evening, with a pulse rate of 112. On the second and third days the temperature and pulse were normal, and the patient appeared to be in a satisfactory condition. On the evening of the fourth day the temperature rose to 100.2°F., and on the sixth day to 103, the pulse rate going up to 120. Examination at this time showed a tender fundus and slightly foul pads. A blood culture was negative. The white-blood-cell count was 18,000 and the red-cell count 3,200,000.

Treatment with sulfanilamide was started with the rise of temperature on the fourth postpartum day, and 90 to 120 gr. were given daily through the seventeenth day. It cannot be said that the sulfanilamide had great effect on the course of the infection. Determinations of the concentration of the sulfanilamide in the blood were made at intervals of a few days. Beginning at 9.8 mg. per 100 cc. it ran up to 18.3 mg. on the seventeenth day. At that point the administration of sulfanilamide was stopped temporarily.

On the eleventh postpartum day, the red count having fallen to 2,250,000 and the pulse and temperature remaining elevated in spite of the continuous administration of sulfanilamide, the first of a series of small transfusions was given. This was followed by a marked improvement in the patient's general condition and a definite drop in the temperature and pulse rate. This improvement was only temporary, however, and repeated transfusions were given after intervals of two days.

On the eighteenth day the temperature rose to 104.6°F., and the pulse rate to 140. Another blood culture showed no growth. The white-cell count was 17,100, and the red-cell count 2,200,000. Vaginal examination showed a uterus that was fairly well involuted, slightly tender vaults but no masses. The urine showed a large trace of albumin. The sediment contained 3 to 4 white blood corpuscles per high-power field. A consultation was held with an internist who found nothing abnormal in the chest.

After the fourth transfusion on the nineteenth day, there was a considerable improvement in her general condition. The temperature and pulse were lower for several days, and the red-cell count rose to 3,000,000. This improvement lasted nearly a week. On the twenty-sixth day, after the temperature had been normal for twelve hours, the patient had a severe chill. The temperature rose to 102°F., and the pulse rate to 90. The white-cell count fell off to 7,200, and the red-cell count to 2,600,000. Another blood culture was taken, which showed no growth. Vaginal examination showed a purulent vaginal discharge and some induration in both broad ligaments. The uterus was well involuted. The urine contained a trace of albumin. The sediment showed 20 to 30 white blood corpuscles per high-power field. A second consultation was held with an internist. This observer found that a loud systolic murmur had developed over the precordia, transmitted to the axilla. Many rales were heard over the bases of both lungs.

Sulfanilamide was started again, 90 to 120 gr. being given during the next three days. Four more transfusions, varying from 240 to 450 cc., were given during the next ten days. From this time on, however, the patient became steadily worse.

A cystoscopy and pyelography were done on the thirty-fifth day because of some urinary symptoms and persistent pyuria. The left ureter was found to be anomalous, with a non-obstructing constriction at the brim of the pelvis. The right ureter was slightly dilated. An x-ray film showed considerable enlargement of the liver.

After each of the transfusions there appeared to be a slight but transient improvement, but the infection continued. During the last forty-eight hours of life, chills recurred with great frequency. The chest showed many rales, breathing became quite rapid, the pulse steadily grew more rapid and weaker, and the temperature rose to 104°F. Death occurred on January 6, thirty-eight days post partum. An autopsy was refused.

Comment. A patient who enters the hospital with a temperature of 100°F., who delivers herself normally with no instrumentation, who has no postpartum hemorrhage and in whom a fatal puerperal infection develops is proof that such infection is not always caused by "introduction of an organism from without." Since no uterine culture was taken and since the blood cultures were negative, sulfanilamide was used empirically rather than intelligently; this, in a way, is unfortunate for it is well known that the drug has no value except in those infections which are caused by hemolytic streptococci.

This case was treated intelligently from the standpoint of conservatism. The uterus was left entirely alone. In spite of all supportive measures, the infection went on to a fatal termination. If permission for an autopsy had been given, valuable information might have been obtained.

MEDICAL POSTGRADUATE EXTENSION COURSES

The following sessions of the Medical Postgraduate Extension Courses have been arranged for the week beginning December 11:

BARNSTABLE

Sunday, December 17, at 4:00 p.m., at the Cape Cod Hospital, Hyannis. Pneumonia. Instructor: Earle M. Chapman. Donald E. Higgins, *Chairman.*

BRISTOL NORTH

Thursday, December 14, at 4:00 p.m., at the Morton Hospital, Taunton. Head and Spine Injuries. Instructor: Walter R. Wegner. Lester E. Butler, *Chairman.*

BRISTOL SOUTH (New Bedford Section)

Friday, December 15, at 4:00 p.m., at St. Luke's Hospital, New Bedford. Indications for Cesarean Section. Instructor: Raymond S. Titus. Robert H. Goodwin, *Chairman.*

ESSEX NORTH

Friday, December 15, at 4:30 p.m., at the Lawrence General Hospital, Lawrence. Pneumonia. Instructor: Chester S. Keefer. John Parr, *Chairman.*

ESSEX SOUTH

Tuesday, December 12, at 4:00 p.m., in the Conference Room of the Salem Hospital, Salem. Common Problems of Neurology: Indications for lumbar puncture. Instructor: T. J. C. von Storch. J. Robert Shaughnessy, *Chairman.*

MIDDLESEX EAST

Tuesday, December 12, at 4:00 p.m., at the Melrose Hospital, Melrose. Syphilis in Pregnancy and the Offspring. Instructor: Rudolph Jacoby. Walter H. Flanders, *Chairman.*

MIDDLESEX NORTH

Friday, December 15, at 4:45 p.m., at St. John's Hospital, Lowell. Syphilis in Pregnancy and the Offspring. Instructor: C. Guy Lane. William S. Lawler, *Chairman.*

WORCESTER (Milford Section)

Tuesday, December 12, at 8:30 p.m., in the Nurses' Home of the Milford Hospital, Milford. Head and Spine Injuries. Instructor: Walter R. Wegner. Joseph Ashkins, *Chairman.*

WORCESTER (Worcester Section)

Friday, December 15, at 8:00 p.m., in the Staff Room of the Worcester City Hospital, Worcester. Convulsions in Infants and Children: Etiology and treatment. Instructor: R. Cannon Eley. George C. Tully, *Chairman.*

WORCESTER NORTH

Friday, December 15, at 4:30 p.m., in the Nurses' Home of the Burbank Hospital, Fitchburg. Operative Deliveries. Instructor: Roy J. Heffernan. George P. Keaveny, *Chairman.*

DEATHS

BORDEN — CHARLES R. C. BORDEN, M.D., of Brookline, died November 28. He was in his sixty-sixth year.

Born in Fall River, he received his degree from Bowdoin Medical School in 1896. He was a staff member of the Boston City Hospital for about twenty years. Dr. Borden was consulting surgeon at the Brookline Contagious Hospital as well as at other local hospitals. For several years he was an instructor of otology at Harvard Medical School. In 1930 he retired from active practice.

Dr. Borden was a member of the Massachusetts Medical Society and the American Medical Association. He also held memberships in the American Laryngological, Rhinological and Otological Society, the American Otological Society, the New England Otological and Laryngological Society and the American College of Surgeons.

His widow and a sister survive him.

CARROLL — JOHN J. CARROLL, M.D., of Holyoke, died November 19. He was in his sixty-second year.

Born in Worcester, he attended the local schools and in 1905 received his degree from the University of Maryland School of Medicine and College of Physicians and Surgeons.

Dr. Carroll had practiced in Holyoke for thirty-five years, thirty-two of which he served as city bacteriologist. He was a fellow of the Massachusetts Medical Society and the American Medical Association, and a member of the Holyoke Tuberculosis Society.

His widow and a daughter survive him.

DEXTER — SMITH O. DEXTER, JR., M.D., of New York City, died November 25. He was in his thirty-third year.

He attended Harvard University and received his degree from Harvard Medical School in 1933. After serving his internship for two years at the Boston City Hospital he became associated with the Hygiene Department at Harvard. He was appointed a teaching fellow in medicine at Harvard Medical School in 1936 and later an assistant in medicine. At the time of his death he was assistant resident in medical research at the Rockefeller Institute in New York City, where he had been associated for the past year.

Among his affiliations he held fellowships in the Massachusetts Medical Society and the American Medical Association.

SALLES — JOHN M. SALLES, M.D., of New Bedford, died November 26. He was in his fifty-sixth year.

Born in New Bedford, he attended the local public schools and in 1911 received his degree from the Baltimore Medical College. He began practice the following year. Dr. Salles was senior physician of the staff of St. Luke's Hospital and served as physician at the Bristol County House of Correction. For many years he was a member of the Board of Health.

He was a fellow of the Massachusetts Medical Society and the American Medical Association, and a member of the New Bedford Medical Society.

A sister and a brother survive him.

CORRESPONDENCE

INAUGURATION OF A HEALTH-SERVICE PLAN IN MASSACHUSETTS

To the Editor: The inauguration of a budgeted health-service plan in Massachusetts is probably of interest to

more physicians than the small number who have become associated with it at its inception. We believe, therefore, that the presentation of a brief description of the plan through the *Journal* is desirable. To this end we have prepared and are enclosing such a description, which we hope you will be able to publish.

As members of the Massachusetts Medical Society who have undertaken the task of organizing the medical service under the plan, we have gone to particular pains to protect the rights of the profession and the quality of the service rendered to the subscribers.

If the profession signifies its interest in further details of the plan, we shall gladly send you for publication, when you so desire, the various agreements pertaining to its organization and operation.

CHANNING FROTHINGHAM,
ROBERT L. DENORMANDIE,
ALLAN M. BUTLER,
HUGH CABOT,
EDWARD L. YOUNG.

* * *

Because of the increasing cost of good medical care, many individuals today, who are self-supporting in the absence of sickness, are forced to become charity patients when confronted with serious illness. Consequently, charitable services are subjected to an uncontemplated burden and physicians are asked to provide free medical care to persons who should pay for professional services. This unsatisfactory state of affairs is recognized by charitable institutions, physicians and patients.

It is generally agreed that the most practical way to keep these patients medically self-supporting is to enable them to budget their medical expenses. The costs of illness are thereby distributed and largely paid for when they are well and when their earning power is not curtailed. Medical service plans to this end have been devised and set in operation by commercial insurance companies, consumer groups, professional groups, and county and state medical societies.

The cash indemnity plans offered by various insurance companies have not met the need. The strict eligibility requirements, the many exclusion-of-benefit clauses and the cancelability of these policies have limited their value. Consumer groups have too often suffered from want of professional knowledge concerning the problems involved and hence from the selection of inadequately qualified professional personnel. Professional groups have often operated on such a restricted basis that sound actuarial risks were not obtained. Most of the plans based on a unit system of payment for services rendered by all licensed physicians within the area covered have thus far proved so unsuited to efficient and economical operation that unsatisfactory service to patients or inadequate remuneration to physicians has been the result.

On the other hand, efficiently organized prepayment plans have been operated for many years by industrial groups, educational institutions and groups of physicians. Some of these plans call for compulsory payments. Others are on a voluntary basis. When well organized they have been able to provide good medical care to the subscribers and satisfactory remuneration to the physicians.

Believing that the consumers of medical care in Massachusetts should be given the opportunity of voluntarily budgeting professional medical costs, as they may voluntarily budget hospital charges, a group of physicians has agreed to furnish medical care to members of a prepayment health service made available by a charitable organization. Two considerations have been in mind in planning for the provision of this medical care. First, the service should make maximum use of and cause minimum disturbance to existing private medical practice. Second, the service should be organized in the interests of efficiency and economy so that physicians may be adequately remunerated for services rendered without necessitating a charge to the subscribing members that would prevent voluntary enrollment. This second consideration obviously places certain limitations on wholly satisfying the first consideration. Yet, it is difficult to see how limitations essential to efficiency and economy are to be avoided if the service is to be financially sound and if physicians and patients are to be treated fairly. Fortunately, when fully analyzed, these limitations are not such as to warrant abandoning hope of extending voluntarily budgeted services, which provide a high quality of medical care and are financially sound.

The health service, which will become available to the public in March, may be outlined as follows. Health Service, Incorporated, has been chartered as a charitable corporation under Chapter 180 of the General Laws of Massachusetts, for the purpose, among others, "of establishing, maintaining and operating a nonprofit health plan whereby medical care and service, both preventive and curative, may be provided at low cost by individuals who are legally qualified to give such medical care and services with whom this corporation shall have contracts directly or indirectly for such care and services to such of the public of low-income, resident in said commonwealth, as become subscribers to the plan and make monthly or other regular payments in accordance therewith." The establishment of a health service by a charitable form of corporation seems desirable for many reasons, among which are the following:

1. The service will be subject to the same public supervision as is that of all charitable corporations.
2. Recent court decisions have held that it is legally valid for charitable corporations to offer such a medical service.
3. It makes possible representation of the lay public, the subscribing members and the medical profession on the board of directors and in the management of the plan.

Members of Health Service, Incorporated, will consist only of individuals and their dependents whose family income is less than $3500 a year. It will accept members only in groups in a manner somewhat similar to the acceptance of members by the Blue Cross. It furthermore recommends that its members be subscribers to a hospital service plan. Health Service, Incorporated, offers to its members professional medical service in the home, in the doctor's office and in the hospital.

A nonprofit partnership of physicians, known as Medical and Surgical Associates, will provide the medical service to the members of Health Service, Incorporated. In the furnishing of medical care, the relation of Medical and Surgical Associates to Health Service, Incorporated, is to be "that of an independent contractor, and Health Service, Incorporated, its officers and employees shall have no voice or authority in the manner, methods or details of the furnishing of said medical care." Physicians, therefore, will manage the medical aspects of the service, and yet will be relieved of the burden of offering the service or collecting the dues. The medical service provided to members by Medical and Surgical Associates will not only include care by practicing internists and pediatricians, but also the services of competent consultants and specialists of all kinds — obstetricians, surgeons, roentgenologists, ophthalmologists, otolaryngologists, bronchoscopists, cardiologists, dermatologists, anesthetists, and so forth. There will be no financial transactions between patient and physician. The patient will make all payments to the central office of

Health Service, Incorporated. The latter will turn over to Medical and Surgical Associates not less than 80 per cent of the payments received. From moneys thus available Medical and Surgical Associates periodically will make payments to physicians of the proportionate amounts to which they shall be entitled. There will be no fee schedule which will compete with or undersell existing medical fees. Any net profits shall be added to a reserve fund as required for the sound conduct of the business or shall be used to increase the income available to physicians rendering the medical care or to decrease the cost of medical care to the subscribing members. No profits will be distributable to the partners.

The opportunity thus offered for budgeting medical costs should permit many individuals in the low-income group who are now forced to become medically indigent to remain the private patients of doctors. Should this prove to be the case, and should the doctors in the communities where members of this service live, co-operate with Medical and Surgical Associates in providing the medical care, the provision of this service to the public should cause little disturbance to existing private practice. To attain this aim co-operation with the profession is earnestly sought. Constructive criticism by the profession is eagerly desired.

The physicians participating in this medical partnership believe that the formation of such medical-service groups, organized in the interest of economy and efficiency for the provision of good medical care, should prove a conservative way of meeting many of the medical problems confronting us today. This plan and others like it should enable many people to obtain adequate medical care by budgeted payments which they can afford. It should diminish public dissatisfaction with medical services and lessen medical indigency. In so far as these ends are realized, the demand for compulsory health insurance should be lessened and the medical needs of the community more wisely satisfied.

ARTICLES ACCEPTED BY THE AMERICAN MEDICAL ASSOCIATION COUNCIL ON PHARMACY AND CHEMISTRY

To the Editor: In addition to the articles enumerated in our letter of October 14 the following have been accepted:

Allen Laboratories, Inc.
- Medipax Brand of Vaginal Tampon-Suppositories With Merthiolate 1:2000
- Medipax Brand of Vaginal Tampon-Suppositories With Metaphen 1:2000

Gane's Chemical Works, Inc.
- Racephedrine
- Racephedrine Sulfate

Wm. S. Merrell Company
- Ampule Bismuth Subsalicylate in Oil, 0.13 gm. (2 gr.), 1 cc.
- Ampule Mercury Salicylate in Oil 0.065 gm. (1 gr.), 1 cc.
- Ampule Mercury Salicylate in Oil 0.1 gm. (1½ gr.), 1 cc.

National Drug Co.
- Antimeningococcic Serum, Refined and Concentrated

E. R. Squibb & Sons
- Amniotin-Squibb
  - Amniotin in Oil, 2000 international units
  - Amniotin in Oil, 10,000 international units
  - Amniotin in Oil, 20,000 international units
  - Amniotin Capsules, 1000 international units
  - Amniotin Capsules, 2000 international units
  - Amniotin Capsules, 4000 international units
  - Amniotin Pessaries, 1000 international units
  - Amniotin Pessaries, 2000 international units

Winthrop Chemical Co., Inc.
- Luminal-Sodium Tablets, 1 gr.

The following product has been accepted for inclusion in the "List of Articles and Brands Accepted by the Council But Not Described in N.N.R.":

Smith-Dorsey Co.
- Tablets Ferrous Sulfate, 3 gr.

PAUL NICHOLAS LEECH, *Secretary.*

535 North Dearborn Street,
Chicago, Illinois.

VACANCIES IN 101ST MEDICAL REGIMENT

To the Editor: Information from Washington indicates that additional units to complete the organization of the 101st Medical Regiment will be authorized in the immediate future. This will mean the organization of one hospital company, one collecting company and three battalion headquarters. In all there are potential openings for about fourteen medical officers. Candidates for these commissions must be graduates of Class A medical schools, be registered by the Massachusetts Board of Registration in Medicine, be able to pass the required physical examinations, be able to qualify before the Massachusetts Military Service Commission and preferably be between twenty-five and thirty-four years of age. Officers of the regiment will gladly discuss the functions of the regiment and give detailed information relative to duties, pay and allowances to prospective candidates or other interested physicians Tuesday or Friday nights from 8:00 until 10:00 at the South Armory, Irvington Street, Boston.

KARL R. BAILEY, Colonel, M. C.,
Massachusetts National Guard,
Commanding.

South Armory,
Irvington Street, Boston.

REPORTS OF MEETINGS

WILLIAM HARVEY SOCIETY

On November 3, at the Beth Israel Hospital, there was a meeting of the William Harvey Society of Tufts College Medical School. Dr. H. E. McMahon introduced the speaker, Dr. Shields Warren, whose subject was "The Effect of Radium and X-ray Irradiation of Tissues."

Dr. Warren, in recalling that his first interest in the subject emanated from a realization of the unfavorable aspects of irradiation of the leukemias, stressed that the danger of these helpful therapeutic agents was still a reality. Indeed such a threat would always lurk where the untoward effects of irradiation made their appearance only after a delay of days to years after the exposure of tissues. Some interesting and striking evidences of the possible ill-effects were demonstrated by cases in the speak-

er's experience. There was the hemangioma overtreated in infancy due to the innocent ruse of a mother who lived to see a carcinoma arise at the site of the atrophic scar when the boy was eighteen years old. More rapidly effective results were the extensive burns of the fingers in an orthopedic intern, whose surgical career was ended due to a failure of his superiors to warn him of the insidious dangers of the fluoroscope when improperly used. Other examples of the dynamic effects of radioactive substances were the cases of the watch-dial painters, whose slight exposure over a period of years resulted in aplastic anemias, leukemias and osteogenic sarcomas. Finally, Dr. Warren showed a photomicrograph of a fibrosarcoma which had arisen in the stroma of an epidermoid carcinoma that was finally cured by small multiple doses of irradiation.

The speaker chose to confine his remarks to the effects of the gamma rays of radium and the usual range of therapeutic x-rays rather than to discuss the possibilities of newer developments, such as the cyclotron.

Dr. Warren reminded his audience that irradiation follows the general laws of the electromagnetic spectrum in that the intensity of the effect is inversely proportional to the square of the distance from the source of the rays. The second universal law of physics followed by these agents is that the effect of the irradiation hinges on the amount of absorption by the tissues, and that consequently the more penetrating, shorter, high-voltage rays cause less damage to intervening normal tissue.

The first effect of irradiation discussed was that on living cells. Such effects, it was pointed out, might result from a direct action on the cells themselves, or as a result of changes in the connective-tissue stroma, or secondary to changes in the vascular supply. The picture seen in irradiated cells showed no qualitative difference when gamma rays of radium or various wave-lengths of x-rays were employed, showing that the essential effect of all rays in practical use was identical. In the cell, the first change noted was in the Golgi apparatus, which was broken up and heaped into a conglomerate mass. Later was seen a failure of the chromosomes to separate properly and an inability of the cells to carry on normal regeneration. Even in those cells able to reproduce, a loss of chromosomes resulted invariably in death of some of their progeny. It has become an accepted fact that cells in mitosis are far more pregnable to irradiation, especially when in the prophase. These phenomena were represented as the result of the absorption of radiant energy by the cell nucleus, the energy being produced by the ionization secondary to the impingement of high-velocity rays on the molecules. The changes described, however, were not held to be specific for irradiation, since heat, protoplasmic poisons and ultra-violet light can produce such a picture. It is only when the entire tissue, with its characteristic cellular, stromal and vascular variations is considered that a specific irradiation effect is recognized.

Dr. Warren also showed illustrations of the vascular changes induced by therapeutic x-rays and emphasized their importance in altering the nutrition of the irradiated area. It is the vascular endothelium which is particularly susceptible, and radiation therapy results in the formation of hyaline thrombi and a replacement of endothelium by connective tissue.

The importance of the substrate of a tumor in determining the outcome of irradiation therapy was illustrated by the comparison between a basal-cell carcinoma of the cheek and a similar lesion on the nose or ear. Due to the response of vascular and connective tissue, the results in the former region far surpass those in the latter areas where the lesions overlie bone or cartilage.

Dr. Warren then proceeded to some of the more practical aspects of therapeutic irradiation. He showed how a clear understanding of the aforementioned inverse-square law had allowed the clinicians to raise the curability rate of basal-cell carcinoma by removing the source of energy to such a distance that the entire tumor, and not merely the surface cells, received an adequate dosage. The insertion of seeds was another method described to attain proper distribution and adequate dosage of irradiation — two factors of far more importance than the type of irradiation employed.

The next topic discussed was the variation in sensitivity of tissues, the very fact which makes irradiation of therapeutic value. The well-known sensitivity of the more immature and more undifferentiated cells was demonstrated by rabbit experiments and human results. Radium placed near one surface of a rabbit's ear caused after eighteen months a denuding of the epithelium of both surfaces without altering the differentiated, non-vascular intervening cartilage. In practical therapeutics Dr. Warren pointed out the radio-resistance of gastrointestinal mucosa and its tumors compared with those of both alimentary orifices. Then again, radium treatment for cancer of the uterine cervix was shown by photomicrography to destroy entirely the cervical epithelial tumor cells while sparing the more highly differentiated glands of the endocervix.

The fact that even normal tissue had a considerable effect from irradiation was often overlooked with resultant ill-effects in surrounding organs. The use of multiple portals focused on such a site as the cervix was considered the main answer to that problem. The use of small doses over a long period, unless properly spaced, does not solve the issue, for cells definitely acquire a tolerance on repeated irradiation, by whatever mechanism. One should plan to cure on the first attempt since recurrences are more radioresistant.

Dr. Warren discussed some of the inevitable sequelae of even properly conceived therapy with these agents. Radiation burns were considered equivalent to surgical scars, making it necessary to consider such natural results in weighing the value of the therapy. Another of the more important side effects of irradiating biological material was the lowered resistance to infection which so often was discovered on subsequent ill-advised surgery, such as a simple exodontia as long as two years after therapy had been terminated. The mechanism of this altered resistance was not a reflection of any measurable change in opsonic index, leukocytes or any other general factor. It seemed purely an unexplained localized interference with the normal protective powers.

In conclusion, Dr. Warren mentioned some of the unsettled problems in the field of irradiation: the reasons for sensitivity and resistance which will explain how 200 r may control a lymphoma while 8000 r may have no effect on a sarcoma; the reason irradiation arrests mitosis primarily in the prophase while another agent arresting mitosis, colchicine, interferes largely at the metaphase; and the reason for the vacuolization of irradiated cells. The great promise of irradiation in the future of tumor therapy lies, thinks Dr. Warren, in its almost phenomenal selectivity in regard to its lethal effect on tissues.

HARVARD MEDICAL SOCIETY

The season's first meeting of the Harvard Medical Society, held at the Peter Bent Brigham Hospital on October 10, 1939, was inaugurated with the customary presentation of cases.

The first patient was a twenty-three-year-old man who

was referred to the hospital by his local physician because of multiple infections of the fingers and toes. Five weeks prior to entry, the patient "broke out with two carbuncles" on his neck, which he treated with Sylpho Nathol. He alleged that these cleared up in about one week. One week later a carbuncle appeared over the spine of the right scapula, which was treated unsuccessfully by his local doctor. Two weeks before admission the patient experienced what seemed to him a "cold," with a temperature of 101°F., a rough throat, a running nose and malaise. The fever had continued to date. Five days before entering the hospital, the patient was awakened from sleep by severe throbbing pains in both third toes, thumbs and index fingers. The use of Freezone resulted in severe burns which were treated by excision and heat. When no improvement was seen, the patient was referred to the hospital.

During the preceding month, there had been nosebleeds on two occasions and dyspnea without exertion several times. There had also been one or two chills and several night sweats. Four weeks before admission there had been blurring of vision of the left eye, and one week before an icteric tint was noted in the sclerae. There had been a weight loss of 15 pounds in the four-week period.

Physical examination revealed a pale, chronically ill young man. There was questionable atrophy of the left macula. A granulating area 5 cm. in diameter was found over the spine of the right scapula, and a similar area 1 cm. in size over the left iliac crest. The lesion of the fingers and toes presented grayish, sloughing, macerated skin, with multiple sinuses exuding a moderate amount of thin yellow fluid.

Laboratory findings revealed a moderate secondary anemia, a leukocytosis of 14,000 to 19,000 and a positive blood culture for *Staphylococcus aureus*. Urinalysis showed varying numbers of red and white blood cells. X-ray examination showed osteomyelitis of both index fingers, but no infected bone was demonstrable elsewhere.

Treatment in the hospital had consisted of incision and debridement of the localized digital lesions, transfusions twice a week, intradermal toxoid every second day and general supportive measures. An autogenous vaccine was being prepared.

The patient continued to have a temperature swinging from 100 to 104°F., while the local lesions showed only slight improvement. The impression on admission was that the case was one of furunculosis complicated by second-degree chemical burns and secondary infection.

Dr. Elliott C. Cutler in discussing the case cited the seriousness of infection with a bacterium which is commonly of low virulence in a host who has a low immunity. He suggested that such a case might be an indication for the use of immunotransfusions as worked out by Janeway. Dr. Soma Weiss emphasized the importance of great watchfulness for new metastatic abscesses, which should be drained immediately to lessen the chance of continuing foci of infection.

The second case was that of a sixty-one-year-old man who had entered the hospital for the second time, this admission having been for increasing attacks of paroxysmal dyspnea associated with ankle edema. On his first entry ten years previously, the patient had had evidence of heart disease with precordial pain, rapid pulse and poor heart sounds. A basal metabolic rate at that time was greatly elevated, and a diagnosis of thyrotoxic heart disease was made despite the absence of a palpable gland. The diagnosis was not accepted and no operation was performed. A short time later, however, a subtotal thyroidectomy was carried out at another hospital and the patient experienced gradually increasing relief from his painful cardiac attacks. He felt essentially well until a few months before his second admission when he had had episodes of dyspnea without exertion but had experienced no pain.

In discussing the case, Dr. Samuel A. Levine pointed out the trend in acceptance of thyrotoxic heart disease as a true entity. The diagnosis of masked hyperthyroidism was not widely accepted ten years ago. He emphasized that the patient's complaint at the present admission was paroxysmal dyspnea rather than precordial pain relieved by nitroglycerin as on previous entry. Whereas before he had had heart disease, he was now showing evidence of heart failure unassociated with any thyrotoxic element. Dr. Weiss continued the discussion with the pertinent reminder that anginal attacks usually disappear with the onset of congestive heart failure.

Dr. Cutler, in introducing the speaker of the evening, retraced the relatively short history of cardiac surgery from the first suture of a lacerated human heart in 1896 through the more recent attempts of Beck, Shaughnessy and others to improve the blood supply of impoverished myocardium by muscle and omental transplants. The speaker of the evening was Dr. Mercier Fauteux, of McGill University and the Royal Victoria Hospital, Montreal, and his subject was entitled "A New Surgical Method to Improve the Blood Supply to the Heart in Coronary Disease."

Dr. Fauteux's approach to the problem, although based on the pathology and pathologic physiology of coronary heart disease, differed from that of Beck and Shaughnessy in that he employed no external source to improve the blood supply to the heart. In order to determine the most commonly affected coronary artery, the speaker examined two hundred hearts and corroborated the finding of Dr. Alan R. Moritz, formerly of Cleveland, that the left descending branch was wholly or partially occluded alone in 46 per cent of cases and in combination in another 25 to 30 per cent. It was therefore decided to limit experimental work to this commonly affected member of the coronary system.

Dr. Fauteux divided the disorders following coronary occlusion into a mechanical or hydraulic one and a physiologic one of vasoconstriction. Sympathectomy in angina pectoris was described as an attempt to alleviate spasm and pain by attacking the latter, whereas the use of supplementary transplants was aimed at the mechanical inadequacy.

The pathological and physiological basis for the work of Dr. Fauteux was divided into two parts corresponding to the mechanical and physiologic disorders previously mentioned. The speaker himself had noted a fall in blood pressure distal to the occlusion of the ramus descendens. Consequently, the small amount of arterial blood from the anastomotic bed was quickly drained by veins accustomed to a much greater blood volume, and there was not enough time allowed for nourishment of the myocardium. The ligation of the coronary vein corresponding to the diseased artery seemed to be a logical procedure. This principle has been used in peripheral vascular disease with good results in some instances. As long ago as 1913, Appell reported the successful use of femoral vein ligation for gangrene of the toes. Makins, during the World War, advocated ligation of the corresponding vein whenever the artery to an extremity had to be sacrificed. Brooks also demonstrated the value of vein ligation. More recently, Van Gorder has reported on the same successful results in gangrene of an extremity by ligation of the vein to the part. The mechanism suggested by the speaker to account for the phenomenon was that ligation of the vein increased the venous pressure which subsequently raised

the resistance of the capillary bed and caused its permanent dilatation. As a result the small flow from the anastomotic vessels became functionally valuable due to its slower and more widespread dispersion. Backflow from the venous side was not considered an important contribution. Acute experiments, that is, the ligation of a healthy artery and vein, showed the blood poorly aerated, but this could not be considered comparable to the conditions obtaining in coronary occlusion in man, where a gradual increase of anastomoses has been occurring while the main artery has been decreasing in caliber.

In order to prove his contention, Dr. Fauteux tried to produce coronary occlusion by ligation of the descending branch of the left coronary artery at varying levels from its origin. In all instances, however, the dogs died immediately or within forty-eight hours from ventricular fibrillation. The speaker said he is now attempting to thrombose the artery gradually in order to simulate human coronary disease and then do a subsequent resection of the vessel. However, if the left coronary vein was first ligated and then the artery acutely occluded as in the above experiment, all the animals lived. When the animals were finally sacrificed, no gross changes were found in the myocardium and microscopic examination showed that normal vessels coursed through the small infarcts that were present. And so the mechanical insufficiency could be combated by ligation of the coronary vein.

In regard to the physiological problem of vasoconstriction, the speaker and others had shown that this phenomenon, although found in the presence of a diseased artery, was abolished when the affected artery was resected. In fact an actual dilatation followed such a procedure and an increased vascular supply to the area resulted. Therefore arteriectomy as well as ligation of the corresponding vein was the procedure followed in the experimental work on dogs, and the results were those reported above.

After four years of diligent investigation, Dr. Fauteux believed that the results justified attempting the alleviation of coronary disease in man by a similar procedure. However, due to the technical difficulties of separating the coronary artery, resection of the artery was not to be attempted, but merely ligation of the left coronary vein. In April, 1939, a man with a history and electrocardiographic findings typical of coronary disease was operated on with comparative technical ease. An electrocardiogram two days after operation showed the formerly inverted T wave to be upright and other abnormalities to be decreased. Whereas formerly the patient could neither walk nor work, he was able within a few months to walk twenty-five minutes twice a day, resume light work and even gain weight with apparent impunity. Electrocardiographic studies during the operation showed no arrhythmias or pulse-rate changes. Dr. Fauteux emphasized the fallacy of drawing any general conclusions from one case and also the necessity of choosing future cases wisely. The patient must be evaluated and be known to have true coronary occlusion rather than a mild angina, and must be otherwise in excellent condition.

Dr. Cutler initiated the discussion by suggesting that although the theory was sound where the injured artery was in the neighborhood of a rich anastomotic bed, such a state was not shown to exist in the myocardium.

Dr. Weiss agreed with the speaker that the mechanism whereby the venous ligation benefited the myocardial nourishment was one of increased capillary resistance and increased capillary volume but made the further suggestion that as a result the same blood flow nourished more adequately due to the greater volume available. He suggested the analogy to chronic anemia, where a hemoglobin value of 20 to 25 per cent may sustain a person with comparative comfort, whereas one of 50 per cent in acute blood loss may be totally inadequate.

Dr. Monroe J. Schlesinger suggested that the tying of the artery immediately following that of the vein might merely take advantage of a temporary venous engorgement and that an interval should be allowed for equilibrium to occur.

Dr. Fauteux replied that such an experiment had been done, ligation of the artery having been carried out one year after occlusion of the vein. The results in such a case proved even more striking, so that temporary congestion certainly was not the only or even the most important explanation.

Dr. Robert E. Gross was invited by Dr. Cutler to report on his experiences with surgical attempts to increase the blood supply to the heart. Originally, the plan had been to cause adhesions between the pericardium and myocardium, but it was found that the vascularity was insufficient to offset any measurable ischemia. However, combination of adhesions and ligation of the coronary vein, as suggested by Dr. Fauteux, has resulted in strikingly better vascularity. Dr. Gross raised one objection to the procedure of venous ligation in the human being, namely that the proximity of the artery and vein might result in irritation of the artery with subsequent spasm and fibrillation in an already embarrassed heart.

Dr. Fauteux suggested that the technical difficulties were not by any means insurmountable, and that the use of quinidine and novocaine solution as suggested by Beck and Moritz assured a lack of spasm and could even cause the heart to regain its regularity in experimentally produced arrhythmias.

In closing, Dr. Cutler agreed with the speaker that the heart was in reality a tough organism which could stand considerable operative handling with minimal dysfunction, and that the technicalities were actually an insignificant difficulty. The outstanding problem would be a proper evaluation of the results obtained in a disease with so few measurable criteria. The meeting closed with the showing of a two-reel motion picture, explaining the rationale and showing the technical details of Dr. Fauteux's animal experiments.

NOTICES

REMOVAL

JOHN R. BARKER, M.D., announces the removal of his office to 1101 Beacon Street, Brookline.

BOSTON DISPENSARY

A luncheon meeting of the clinical staff of the Boston Dispensary will be held on Friday, December 15, in the auditorium of the Joseph H. Pratt Diagnostic Hospital at 12 o'clock noon.

The program, under the auspices of the Social Service Department, will begin at 12:30 p.m.

Medical Social Service in the Boston Dispensary, 1908-1939.
Its Beginning. Mrs. Hilbert F. Day.
Its Function. Miss Kate McMahon.
Report of the Year 1938. Miss Edith Canterbury.

All interested in the subject are cordially invited to attend.

ROBERT W. BUCK, M.D., *President,*
JAMES M. BATY, M.D., *Secretary.*

BOSTON CITY HOSPITAL

The monthly clinicopathological conference will be held at the Boston City Hospital on Wednesday, December 13, at 12 o'clock noon, in the Pathological Amphitheater.

JOSEPH E. HALLISEY, M.D., *Secretary*,
Medical Staff.

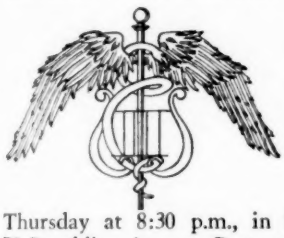
BOSTON LYING-IN HOSPITAL

There will be a meeting at the Boston Lying-in Hospital on December 20, at 8:15 p.m.

PROGRAM

Delayed Labor. Dr. S. A. Cosgrove, medical director, Margaret Hague Maternity Hospital, Jersey City, New Jersey.

BOSTON DOCTORS' SYMPHONY ORCHESTRA



The Boston Doctors' Symphony Orchestra will rehearse under Alexander Theide, former concertmaster with the Cleveland Symphony Orchestra and the Philadelphia Symphony Orchestra, every Thursday at 8:30 p.m., in Studio A, Station WMEX, 70 Brookline Avenue, Boston. Those interested in becoming members should communicate with Dr. Julius Loman, Pelham Hall Hotel, Brookline (BEA 2430).

TUMOR CLINIC, BOSTON DISPENSARY

Each Tuesday and Friday morning, 10:00 to 12:30, there is a meeting of the Tumor Clinic of the Boston Dispensary, a unit of the New England Medical Center. Neoplasms of various sorts are seen and discussed, and when there is an indication, are treated with radium or high-voltage x-ray. Physicians are invited to visit this clinic. They may bring patients for aid in diagnosis or may refer patients to the clinic following which a report will be returned to the referring physician. A limited number of beds are available for diagnostic study and for treatment.

SOUTH END MEDICAL CLUB

The next meeting of the South End Medical Club will be held at the headquarters of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston, on Tuesday, December 19, at 12 o'clock noon. Dr. John D. Adams will speak on "Observations of Thirty Years' Experience in Treatment of Fractures."

Physicians are cordially invited to attend.

JOHN B. HALL, M.D., *Secretary*.

HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held on Tuesday, December 12, in the amphitheater of the Peter Bent Brigham Hospital (Shattuck Street entrance), at 8:15 p.m.

PROGRAM

Presentation of cases.
Tissue Electrolytes. Dr. A. Baird Hastings.

Medical students and physicians are cordially invited to attend.

ROBERT M. ZOLLINGER, M.D., *Secretary*.

PETER BENT BRIGHAM HOSPITAL

A joint medical and surgical clinic at the Peter Bent Brigham Hospital will be held on Wednesday, December 13, from 2 to 4 p.m. Drs. John Homans and S. A. Levine will speak on "Edema." A clinicopathological conference, conducted by Dr. Elliott C. Cutler, will take place from 4 to 5 p.m.

On Thursday, December 14, from 8:30 to 9:30 a.m. there will be at the Children's Hospital, a combined clinic, conducted by Dr. Frank Ober, of the medical, surgical, orthopedic and pediatric services of the Children's Hospital and the Peter Bent Brigham Hospital.

Physicians and students are cordially invited to attend.

ELLIOTT C. CUTLER, M.D., *Secretary*.

CARNEY HOSPITAL

The monthly clinical meeting and luncheon of the Carney Hospital will be held on Monday, December 11, at 11:30 a.m.

PROGRAM

Case reports.
Urinary Incontinence in the Female: The Kennedy operation (with lantern slides and demonstration). Dr. R. J. Heffernan. Discussion: Drs. L. E. Phaneuf, R. C. Graves and E. L. Kickham.

Physicians and medical students are cordially invited to attend.

ROY J. HEFFERNAN, M.D., *Secretary*.

NEW ENGLAND HEART ASSOCIATION

The next meeting of the New England Heart Association will be held at the Peter Bent Brigham Hospital, Monday, December 18, at 8:15 p.m.

PROGRAM

Nature of the Peripheral Resistance. Drs. E. A. Stead, Jr., and Paul Kunkel.
The Hemodynamic Effects of the Application of Tourniquets. Dr. R. V. Ebert.
Constricting Pleuritis and Pericarditis. Drs. C. S. Burwell and G. D. Ayer.
Uncommon Types of Heart Disease. Dr. Soma Weiss.
Is the Ewart's Sign due to Pericardial Effusion? Dr. F. C. Gevalt, Jr.
The Value of Electrocardiography in the Prognosis of Coronary Thrombosis. Dr. F. F. Rosenbaum.
Sulfanilamide and Heparin in the Treatment of Subacute Bacterial Endocarditis. Drs. P. B. Beeson and S. A. Levine.

Interested physicians and medical students are invited to attend.

EDWARD F. BLAND, M.D., *Secretary*.

NEW ENGLAND ROENTGEN RAY SOCIETY

The next meeting of the New England Roentgen Ray Society will be held on Friday, December 15, at 8 p.m. at the Beth Israel Hospital.

PROGRAM

Roentgen Visualization of the Coronary Arteries. Dr. M. J. Schlesinger.
Clinical Implication of the Pathologic Findings. Dr. H. L. Blumgart.
The Value of Cholangiography During Operation. Dr. C. G. Mixter.

Early Diagnosis of Prepyloric Carcinoma. Dr. Karl Presser.

Changes in the Uterus Following Roentgen Therapy: Demonstrated by uterography. Dr. W. S. Altman.

Observations on Contact Roentgen Therapy. Dr. H. F. Friedman.

Dinner at the Harvard Club will be served at 6:30 p.m.

LANGDON P. THAXTER, M.D., *President,*
AUBREY O. HAMPTON, M.D., *Secretary.*

NEW ENGLAND DERMATOLOGICAL SOCIETY

The next meeting of the New England Dermatological Society will be held on Wednesday, December 13, at 2:00 p.m. at the Boston City Hospital.

BERNARD APPEL, M.D., *Secretary.*

UNITED STATES MARINE HOSPITAL

The staff meeting of the United States Marine Hospital, Chelsea, Massachusetts, will be held at "The Hut," on Friday afternoon, December 15, at 4:00.

PROGRAM

Handwriting and Personality. Mr. John C. G. Loring.

JOHN W. TRASK, *Medical Director in Charge.*

PHI DELTA EPSILON

The Phi Delta Epsilon medical fraternity will hold its thirty-sixth annual convention at the Waldorf Astoria Hotel on December 29 and 30. About 600 physicians and medical students from this country and Canada will attend. Dr. Morris Fishbein, editor of the *Journal of the American Medical Association,* who is national president of the fraternity, will preside at the sessions.

SOCIETY MEETINGS AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, DECEMBER 11

MONDAY, DECEMBER 11

*11:30 a.m. Carney Hospital. Monthly clinical meeting and luncheon.

*12:15 p.m.–1:15 p.m. Clinicopathological conference. Dr. S. Burt Wolbach, Peter Bent Brigham Hospital amphitheater.

TUESDAY, DECEMBER 12

*9–10 a.m. Some Ophthalmoscopic Signs in Constitutional Disease. Dr. Joseph J. Skirball. Joseph H. Pratt Diagnostic Hospital.

*10 a.m.–12:30 p.m. Boston Dispensary tumor clinic.

*12:15 p.m.–1:15 p.m. X-ray conference. Dr. Merrill C. Sosman. Peter Bent Brigham Hospital amphitheater.

*8:15 p.m. Harvard Medical Society. Amphitheater, Peter Bent Brigham Hospital (Shattuck Street entrance).

WEDNESDAY, DECEMBER 13

*9–10 a.m. Hospital case presentation. Dr. S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

*12 m. Clinicopathological conference. Children's Hospital amphitheater.

12 m. Boston City Hospital. Monthly clinicopathological conference. Pathological amphitheater.

2 p.m. New England Dermatological Society. Boston City Hospital.

*2 p.m.–4 p.m. Joint medical and surgical clinic. Peter Bent Brigham Hospital.

THURSDAY, DECEMBER 14

*8:30 a.m.–9:30 a.m. Combined clinic of the medical, surgical, orthopedic and pediatric services of the Children's Hospital and the Peter Bent Brigham Hospital, at the Children's Hospital.

*9–10 a.m. Gastrointestinal clinic: Presentation of cases. Dr. K. S. Andrews. Joseph H. Pratt Diagnostic Hospital.

FRIDAY, DECEMBER 15

*9–10 a.m. Sir James Mackenzie: General practitioner. Dr. Joseph H. Pratt. Joseph H. Pratt Diagnostic Hospital.

*10 a.m.–12:30 p.m. Boston Dispensary tumor clinic.

*12 m. Urological conference at the Massachusetts General Hospital, lower amphitheater, Out-Patient Department.

12 m. Clinical meeting of the Children's Medical Service, Massachusetts General Hospital. Ether Dome.

*12 m. Boston Dispensary. Clinical staff meeting. Auditorium of the Joseph H. Pratt Diagnostic Hospital.

8 p.m. New England Roentgen Ray Society. Beth Israel Hospital.

SATURDAY, DECEMBER 16

*9–10 a.m. Hospital case presentation. Dr. S. J. Thannhauser. Joseph H. Pratt Diagnostic Hospital.

*10 a.m.–12 m. Medical staff rounds of the Peter Bent Brigham Hospital. Conducted by Dr. Marshall N. Fulton.

*Open to the medical profession.

DECEMBER 8 — William Harvey Society. Page 676, issue of October 26.

DECEMBER 8 — Waltham Hospital. Staff meeting. Page 880, issue of November 30.

DECEMBER 11 — Carney Hospital. Monthly clinical meeting and luncheon. Page 917.

DECEMBER 12 — Harvard Medical Society. Page 917.

DECEMBER 13 — International College of Surgeons. Page 880, issue of November 30.

DECEMBER 13 — Boston City Hospital. Monthly clinicopathological conference. Page 917.

DECEMBER 13 — New England Dermatological Society. Notice above.

DECEMBER 13 — Peter Bent Brigham Hospital. Joint medical and surgical clinic. Page 917.

DECEMBER 14 — Combined clinic of the medical, surgical, orthopedic and pediatric services of the Children's Hospital and the Peter Bent Brigham Hospital. Page 917.

DECEMBER 14 — Pentucket Association of Physicians. 8:30 p.m., Hotel Bartlett, Haverhill.

DECEMBER 15 — New England Roentgen Ray Society. Page 917.

DECEMBER 15 — Waltham Hospital. Clinicopathological conference. Page 880, issue of November 30.

DECEMBER 15 — Boston Dispensary. Clinical staff meeting. Page 916.

DECEMBER 15 — United States Marine Hospital. Notice above.

DECEMBER 18 — New England Heart Association. Page 917.

DECEMBER 19 — South End Medical Club. Page 917.

DECEMBER 20 — Boston Lying-in Hospital. Page 917.

DECEMBER 22 — Waltham Medical Club. Page 880, issue of November 30.

DECEMBER 27 — Metropolitan State Hospital. Clinicopathological conference. Page 880, issue of November 30.

DECEMBER 29 and 30 — Phi Delta Epsilon. Notice above.

JANUARY 6, JUNE 8–11, 1940 — American Board of Obstetrics and Gynecology. Page 160, issue of July 27, and page 798, issue of November 16.

JANUARY 22–25, 1940 — American Academy of Orthopaedic Surgeons. Hotel Statler, Boston.

FEBRUARY 11–14 — International College of Surgeons. Page 759, issue of November 9.

MARCH 2, JUNE 8 and 10 — American Board of Ophthalmology. Page 719, issue of November 2.

MARCH 7–9, 1940 — The New England Hospital Association. Hotel Statler, Boston.

MAY 14, 1940 — Pharmacopoeial Convention. Page 894, issue of May 25.

JUNE 7–9, 1940 — American Board of Obstetrics and Gynecology. Page 1019, issue of June 15.

DISTRICT MEDICAL SOCIETIES

ESSEX NORTH

JANUARY 3, 1940 — Semi-annual meeting. Combined meeting with Essex South. Danvers State Hospital, Hathorne. 7 p.m.

ESSEX SOUTH

JANUARY 3, 1940 — "Head Injuries." Dr. John S. Hodgson. Danvers State Hospital, Hathorne.

FEBRUARY 14 — "Cough, Sputum, Hemoptysis — How shall they be investigated?" Dr. Reeve H. Betts. Essex Sanatorium, Middleton.

MARCH 6 — "Experimental and Clinical Considerations of Sulfanilamide Treatment of Hemolytic Streptococcal Infections." Dr. Champ Lyons. Lynn Hospital, Lynn.

APRIL 3 — Addison Gilbert Hospital, Gloucester.

MAY 8 — Annual meeting. Salem Country Club, Peabody.

HAMPSHIRE

JANUARY 10, 1940.

MARCH 13.

MAY 8.

All meetings are held at 11:30 a.m. at the Cooley Dickinson Hospital, Northampton.

MIDDLESEX EAST

JANUARY 10, 1940.

MARCH 20.

MAY 15.

Meetings are held at 12:15 p.m. at the Unicorn Country Club, Stoneham.

MIDDLESEX NORTH

JANUARY 31, 1940.
APRIL 24.
JULY 31.
OCTOBER 30.

NORFOLK SOUTH

DECEMBER 7.
JANUARY 4, 1940.
FEBRUARY 1.
MARCH 7.
APRIL 4.
MAY 2.

All meetings, with the exception of one which is usually held at the Quincy City Hospital, are held at the Norfolk County Hospital in South Braintree, at 12 o'clock noon.

PLYMOUTH

JANUARY 18, 1940 — Brockton Hospital, Brockton.
MARCH 21 — Goddard Hospital, Brockton.
APRIL 18 — State Farm.
MAY 16 — Lakeville Sanatorium, Lakeville.

SUFFOLK

JANUARY 31, 1940 — Scientific meeting. Subject to be announced later.
MARCH 27 — Scientific meeting. Symposium on Ulcerative Colitis and Diarrheas. Under the direction of Dr. Chester M. Jones.
APRIL 24 — Annual meeting in conjunction with the Boston Medical Library. Election of officers. Program and speakers to be announced later.

WORCESTER

DECEMBER 13 — St. Vincent Hospital.
JANUARY 10, 1940 — Worcester City Hospital.
FEBRUARY 14 — Worcester State Hospital.
MARCH 13 — Worcester Memorial Hospital.
APRIL 10 — Worcester Hahnemann Hospital.
MAY 8 — Worcester Country Club.

Each meeting begins with a dinner at 6:30 p.m. and is followed by a business and scientific meeting.

BOOKS RECEIVED FOR REVIEW

Obstetrical Manikin Practice. Lyle G. McNeile. 111 pp. Baltimore: Williams & Wilkins Co., 1939. $2.00.

Electrocardiographic Patterns: Their diagnostic and clinical significance. Arlie R. Barnes. 197 pp. Springfield, Illinois, and Baltimore: Charles C Thomas, 1939. $5.00.

Proctoscopic Examination and Diagnosis and Treatment of Diarrheas. M. H. Streicher. 149 pp. Springfield, Illinois, and Baltimore: Charles C Thomas, 1940. $3.00.

The Essentials of Medical Treatment. David M. Lyon. 448 pp. Edinburgh and London: Oliver & Boyd, 1939. 15s.

A Mirror for Surgeons: Selected readings in surgery. D'Arcy Power. 230 pp. Boston: Little, Brown & Co., 1939. $2.00.

Liquor: The servant of man. Walton H. Smith and Ferdinand C. Helwig. 273 pp. Boston: Little, Brown & Co., 1939. $2.00.

The Hospital Care of Neurosurgical Patients. Wallace B. Hamby. 118 pp. Springfield, Illinois, and Baltimore: Charles C Thomas, 1940. $2.00.

Human Helminthology: A manual for physicians, sanitarians and medical zoologists. Ernest C. Faust. Second edition. 780 pp. Philadelphia: Lea & Febiger, 1939. $8.50.

The Electrocardiogram and X-Ray Configuration of the Heart. Arthur M. Master. 222 pp. Philadelphia: Lea & Febiger, 1939. $6.50.

Endocrine Gynecology. E. C. Hamblen. 453 pp. Springfield, Illinois, and Baltimore: Charles C Thomas, 1939. $5.50.

The Surgery of Injury and Plastic Repair. Samuel Fomon. 1409 pp. Baltimore: Williams & Wilkins Co., 1939. $15.00.

Principles and Practice of Aviation Medicine. Harry G. Armstrong. 496 pp. Baltimore: Williams & Wilkins Co., 1939. $6.50.

BOOK REVIEWS

Proctology for the General Practitioner. Frederick C. Smith. 386 pp. Philadelphia: F. A. Davis Co., 1939. $4.50.

This book appears to be of uncertain value. Doubtless the medical student or general practitioner would find profitable information. Much of the material is well presented, and the advice as to treatment is for the most part correct and authoritative. The arrangement of the subject matter, however, is such that there is much unnecessary repetition. The first two chapters, for instance, could be omitted without detriment because practically everything included therein is re-stated in the chapters dealing with the specific disease conditions. The book would likewise be improved and perhaps more likely to be read if the rather sketchy chapters on pilonidal cysts, intestinal parasites, constipation, diarrhea and surgery of the colon were omitted. These subjects hardly belong in a book on proctology and have been much better described in other books.

In addition one must mention several statements which it would seem are incorrect, misleading or at least controversial. For example, it is painful to the surgical "aseptic conscience" to have an author advise the performance of rectal examinations without protecting the finger with a glove or finger cot. There must be few well-informed surgeons who believe that, in general, spinal anesthesia is just as safe as ether. How many anesthetists would agree that the anesthetic combination of nitrous oxide and oxygen with ether does not present danger of explosion when used in the presence of a cautery? What is one to suppose is meant by the "dorsal prone" position? Who also believes nowadays that the so-called nutrient enemas are of distinct alimentative value? The reviewer furthermore objects vehemently to the frequent use of the term "divulsion of the sphincter," which has been warned against by several generations of surgeons. The author must intend the reader to translate this to the proper word, "dilatation." Furthermore, one cannot agree that the treatment of anal cancer is always radiological. It takes little experience with the use of radium or x-ray in this region to learn that radical surgical excision gives better results and makes patients more comfortable. It would seem to have been wise, too, to avoid the controversial subject of the role of the so-called "diplostreptococcus" of Bargen as the cause of ulcerative colitis. It is unfortunate also to have a present-day author group the operations of ileostomy and cecostomy together as surgical treatment and call them both unsatisfactory; every well-informed surgical intern knows better. But it would take another book to point out all the defects. One is left with the impression, however, that the book should have been confined to the subject of proctology.

The Harvey Lectures: Delivered under the auspices of the Harvey Society of New York, 1938-1939. Series XXXIV. 279 pp. Baltimore: The Williams & Wilkins Co., 1939. $4.00.

It is with considerable eagerness that we look forward to the collected Harvey Lectures which are issued yearly by the Harvey Society. They are the "salt" of medical progress in specialized fields. This year's impressive array of lectures deserves special reference: Marrian, "Some Aspects of the Intermediary Metabolism of the Steroid Hor-

mones"; Weech, "The Significance of the Albumin Fraction of Serum"; Du Bois, "Heat Loss from the Human Body"; Cohn, "Proteins as Chemical Substances and as Biological Components"; Park, "Observations on the Pathology of Rickets with Particular Reference to the Changes at the Cartilage-Shaft Junctions of the Growing Bones"; Linderstrom-Lang, "Distribution of Enzymes in Tissue and Cells"; Danforth, "Genic and Hormonal Factors in Some Biological Processes"; Szent-Gyorgyi, "Biological Oxidation and Vitamins." The reviewer is not a sufficient authority in any of these fields to make any critical remarks. The text can be recommended to anyone interested in the foregoing subjects.

John Howard (1726-1790), Hospital and Prison Reformer: A bibliography. Leona Baumgartner. 79 pp. Baltimore: The Johns Hopkins Press, 1939. $1.00.

Mr. Arnold M. Muirhead, whose own collection of Howardiana is now in the library of Dr. John F. Fulton, of Yale University School of Medicine, in his introduction to this book writes: "Here, at last, collected from many scattered sources, is presented in one volume with scholarly orderliness, and yet also with human interest, all the available bibliographical information about John Howard — an inestimable service for which collectors and students alike will long be grateful."

This book will become an indispensable part of the intellectual equipment of those who are or may be interested in prison reform, the public-health movement and the history of medicine. Such readers will always be indebted to Dr. Leona Baumgartner for her efforts in this direction.

Symposium on the Synapse. Herbert S. Gasser, Joseph Erlanger, Detlev W. Bronk, Rafael L. De Nó, and Alexander Forbes. 474 pp. Springfield, Illinois, and Baltimore: Charles C Thomas, 1939. $2.00.

This symposium on the mechanism of synaptic transmission, held under the auspices of the American Physiological Society, has been reprinted from the *Journal of Neurophysiology.*

The five contributors and their subjects are: Herbert S. Gasser, "Axons as Examples of Nervous Tissue"; Joseph Erlanger, "The Initiation of Impulses in Axons"; Detlev W. Bronk, "Synaptic Mechanisms in Sympathetic Ganglia"; Rafael L. De Nó, "Transmission of Impulses through Cranial Motor Nuclei"; and Alexander Forbes, "Problems of Synaptic Function."

This brochure contains a most stimulating discussion of the chemical versus the electrical theories of synaptic transmission. The important point as to whether acetylcholine is a specific product released with regularity at the ganglionic synapses during the act of nerve transmission is re-examined. While the problem cannot at present be stated in precise terms, each student interested in the function of the nervous system will place this volume in a distinct place on the shelves of his library.

District Health Development: Building program as related to the master plan for the City of New York. Department of Health, City of New York. 53 pp. New York: Neighborhood Health Development, Inc., 1939. $1.00.

This is an account of the present state of the building program of the Department of Health of New York City, together with sufficient explanation to emphasize the imperative need of decentralized administration for the largest city's health program. A loose-leaf planographic process is employed, giving very readable typewriting and good illustrations.

The central unit consists of headquarters and a laboratory in Manhattan. Of an approximate total of thirty district health-center buildings, a half are either completed or under construction. In addition a score or more substations are proposed. Budgets and architects' plans are included.

Tuberculosis and Social Conditions in England: With special reference to young adults. P. D'Arcy Hart and G. Payling Wright. 165 pp. London: National Association for the Prevention of Tuberculosis. 1939. 3s.

It is essential in a discussion of the results of this study that reference be made to a similar survey on young women carried out in this country by Edna Nicholson and published in 1938 by the National Tuberculosis Association.

After careful consideration of several apparent etiologic factors in tuberculosis, the American study draws the following conclusion: "We believe, although it cannot be statistically proved, that psychic and physical changes of adolescence and early adult life cause young women to be unusually susceptible to tuberculosis and are the fundamental reason for the high mortality rate." The English workers, too, agree that young women are especially sensitive, probably on a biological basis, to tuberculosis, but they add that such individuals are also very susceptible to environmental factors.

Both studies agree that changes in personal habits, such as the hours spent in bed, the hours of work, the adequacy of meals, clothes, or the money spent on luxuries, have little significance. However, in regard to changes in living standards, such as housing, increasing employment of young women, and poverty, there is no agreement. The English authors stress the fact that the diminution in decline of deaths due to pulmonary tuberculosis is primarily associated with a diminution in rise of standards of living which occurred at the turn of the century.

As a standard of living, the authors used three yardsticks: the incidence of persons receiving poor relief; Stock's Social Index — the proportion of males in the lower economic grades; and the incidence of substandard housing — more than two persons per room. The incidence of tuberculosis was highest among those with poor housing conditions and among those on poor relief. The authors contend that the statistics for housing serve not only as an index for poverty as a whole, but also as a measure of comparing the degree of personal contact. They further add that the apparent improvement in mortality rates since 1933 may possibly be due to an increase in the building of new houses, with its effect on overcrowding.

While the American study by Miss Nicholson concludes that the lessened decline of mortality among young women is entirely due to the female biological factors, the English authors find that it may also be due to the effect of industrial occupation during the important years of adolescence and early adulthood, as well as the decline in the rise of living standards accompanied by set-backs in the improvement of housing conditions.

The English study is very thorough and in all respects seems to be superior to the one done in this country. The sources and methods used by the authors are above reproach, and care has been taken to account for possible sources of error. This study should be of great interest to all persons interested in the epidemiological and social aspects of pulmonary tuberculosis.